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PROGRAM MANAGER

SCIENCE & TECHNOLOGY FROM AN INVESTMENT POINT OF VIEW

Defense Leadership and Management Program (DLAMP)
Grooming the Most Qualified People for DoD's Most Select Positions

Dr. Diane M. Disney
Deputy Assistant
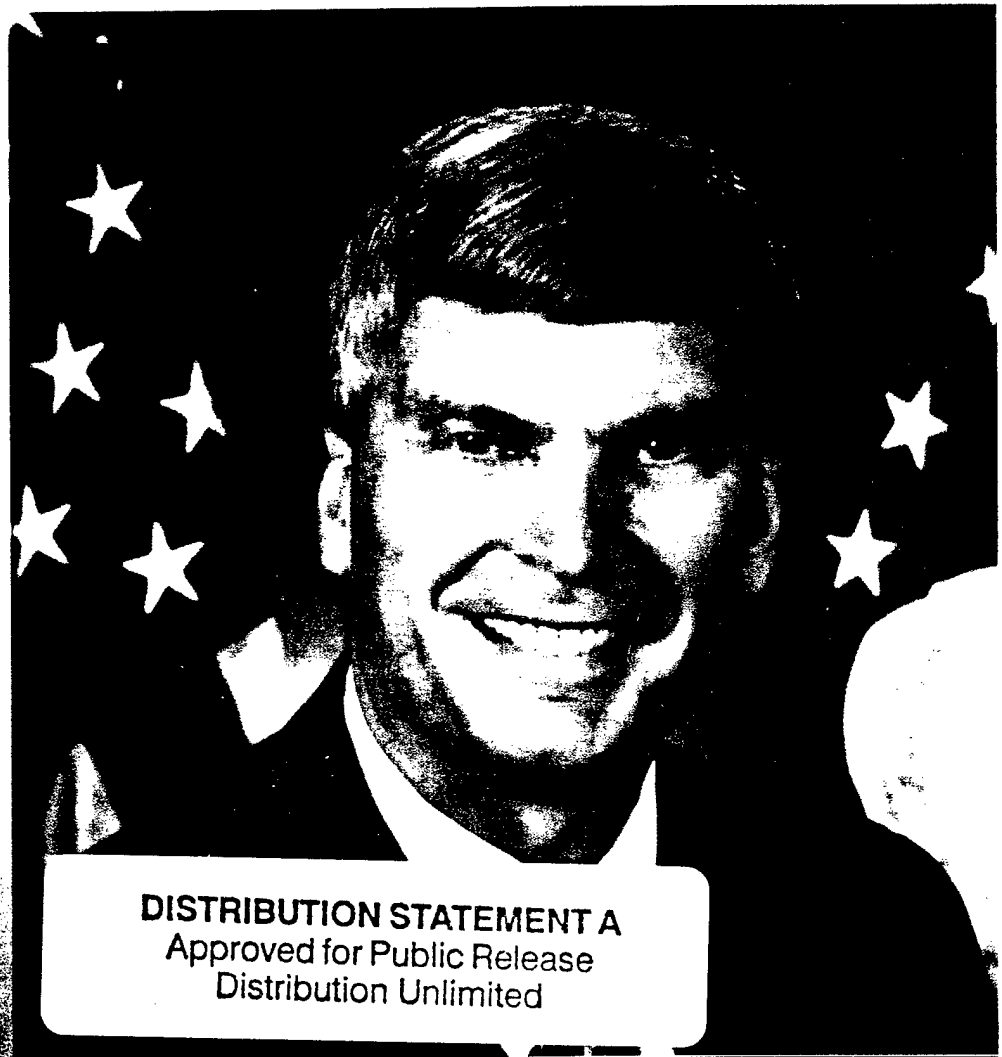*Secretary of Defense*
(Civilian Personnel Policy)

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Acquisition Warrior 1999

Foreign Comparative Testing Program (FCT)

Establishing a Strategic Alliance

JAWS S³—Making Information Work for the Warfighter

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"If we [Air Force] hadn't kept the Maverick AGM-65H/K missile program alive by executing a Cooperative Industry-Interagency Exchange Agreement with Raytheon, this needed weapon system would not be fielded to support the nation's warfighters. It may not be the normal way of doing business, but for us it was the *only* way."

Marc Trinklein
Maverick AGM-65H/K Development System Manager

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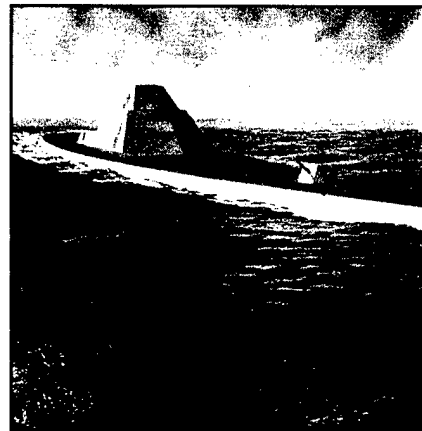

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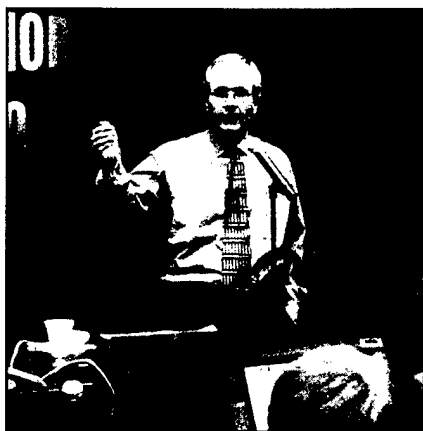

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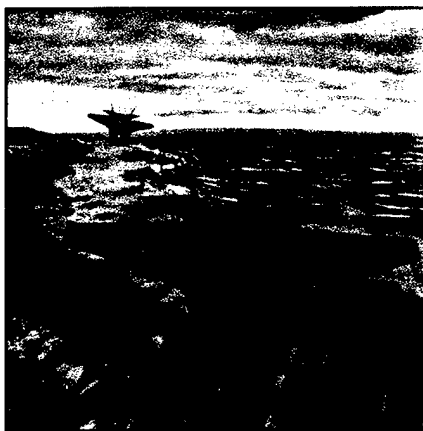
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Cooperative Industry-Interagency Exchange Agreements

Basing a Program on Exchange vs. New Starts Can Reduce Costs, Maximize Value, Minimize Effects of Reduced Funding, Save Taxpayers' Dollars

COLLIE J. JOHNSON

The General Service Administration's (GSA) Office of Government-wide Policy is committed to supporting the efforts of the Air Force and other federal entities in using the exchange/sale authority. Use of that authority enables federal agencies to not only maximize the value of their current personal property assets, but also acquire replacement property that otherwise might not be obtainable. The Air Force missile exchange is an outstanding example of a cooperative interagency endeavor to use that authority. All parties involved should be proud of the significant savings to the taxpayer that are being achieved.

— Rick Bender
General Services Administration

I
n the September-October 1998 issue of *Program Manager,* we featured the first part of an article on a unique government-industry bartering arrangement put together by the Maverick Missile Airframe Team. This innovative agreement between the Air Force, General Services Administration, and Raytheon resulted in the Maverick Missile Airframe Exchange Agreement.[1] Briefly, instead of taxpayers shelling out nearly $1 million to disassemble and demilitarize 1,000 AGM-65A Maverick missiles over 20 years old, the Maverick team devised a way for Raytheon to buy back the missiles from the government for $2 million and harvest the airframes, still in pristine, "like new" condition, for use in current AGM-65D,

F, and G Infrared (IR) Maverick missile production.

A lot has happened since then. They're at it again. This Hammer Award-winning team (Figure 1) didn't stop with their first success.[2] Losing a few members, picking up others, and regrouping, the team is now working on upgrading electro-optically guided AGM-65 air-to-ground Mavericks through reuse of hardware on older Mavericks, resulting in the newer Maverick AGM-65K "seeker."

Led by Marc Trinklein, Maverick Development System Manager at Eglin AFB, Fla., their objective is to extend the service life of the AGM-65 through the use of a Charge Coupled Device (CCD) seeker.

Marc Trinklein — Maverick Development System Manager

AAC/WMG	OO-ALC/LIWGM	GSA
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Becky E. Kirk	Ben Harris	
Ron Edinger	Gary Card	**Raytheon Missile**
Deborah Archie	Capt. Stuart Wolthuis	**Systems Company**
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	AFXORBP	Frank F. Barraza
AAC/JAN	Maj. Bill Lindsey	
Wayne Warner	Col. Doug Lincoln	**HQ ACC/DOTW**
		Maj. Reid Goodwyn

FIGURE 1. **AGM 65-H/K Maverick Missile Upgrade Team**

Johnson is Managing Editor, Program Manager *Magazine, Visual Arts and Press Department, Division of College Administration and Services, DSMC.*

WINS HAMMER AWARD

Dr. Jacques S. Gansler, Under Secretary of Defense (Acquisition & Technology), presented Vice President Gore's Hammer Award to the AGM-65K Maverick Team at the Pentagon July 7.

The AGM-65 Maverick is a tactical, air-to-surface guided missile designed for close air support, interdiction, and defense suppression. The Maverick Team negotiated a unique arrangement whereby AGM-65A missile airframes and AGM-65G Guidance Control Sections were provided to Raytheon for credit toward the purchase of new electro-optical (TV) seekers in support of the AGM-65K upgrade program. Key to their efforts were approval from the General Services Administration to exchange outdated AGM-65A airframes for new improved missiles; and U.S. Air Force approval to exchange AGM-65G Guidance Control Sections for credit. These actions allowed the U.S. Air Force to move forward with their AGM-65K program to buy up to 1,950 missiles at a cost of approximately $18 million vs. the $119 million normally expected, a savings of $101 million.

The Hammer Award is the Vice President's special recognition of teams of federal employees and their partners who have made significant contributions in support of the President's National Partnership for Reinventing Government (NPR) principles – putting customers first, cutting red tape, empowering employees, and getting back to basics – resulting in a government that works better and costs less.

AGM-65K MAVERICK TEAM. PICTURED FROM LEFT: RETIRED AIR FORCE LT. COL. GLENN KULLER, RAYTHEON; MARC TRINKLEIN, EGLIN AFB, FLA.; BEN HARRIS, HILL AFB, UTAH; RICK BENDER, GENERAL SERVICES ADMINISTRATION, WASHINGTON, D.C.; AIR FORCE COL. ROSEANNE "RO" BAILEY, EGLIN AFB, FLA.; AIR FORCE MAJ. BILL LINDSEY, AIR STAFF; DR. JACQUES S. GANSLER, UNDER SECRETARY OF DEFENSE (ACQUISITION & TECHNOLOGY); FRANK ROBINS, EGLIN AFB, FLA; RETIRED AIR FORCE LT. COL. GREG KUNTZ, COMPTEK; SCOTT ZIBRAT, RAYTHEON.

Photo by C. Tyler Jones

G's for K's — Let's Trade

Rather than confuse readers with Maverick alphabet soup, this article focuses primarily on two variants of the Maverick: the older AGM-65G IR missile and the newer AGM-65K CCD missile. (Figure 2 shows the variants of the Maverick Missile to date, along with each missile's capabilities and upgrades.)

Essentially, Raytheon is buying back 1,200 Guidance and Control Sections (GCS) from the Air Force inventory of 5,300 IR-guided AGM-65G's bought after the 1991 Persian Gulf War, exchanging hardware from the older AGM-65G's to fund production of the newer AGM-65K's (thus the term G's for K's). In the process, they are reusing about 1,200 AGM-65G Maverick missiles built since Desert Storm and replacing each missile's IR seeker with a CCD GCS. In addition, Raytheon will be able to use parts of the IR seeker it doesn't need for the CCD for Foreign Military Sales (FMS) customers.

The new missile — the AGM-65K — is the newest electro-optically guided Maverick, carrying a 300-lb. warhead, and is the first new Maverick seeker variant in nearly 15 years. Its CCD GCS offers a large improvement over the old TV-seeker on previous Mavericks, by providing greater reliability than the current TV Maverick inventory, a much clearer picture, greater detection range, and the ability to operate in lower light conditions.

"Actually, the very heart of the program is the CCD camera, based on commercial technology," says Trinklein.

The seeker upgrade became necessary, he explains, because obsolete parts made it very difficult to maintain the older vidicon-based TV Mavericks. Initially, the Air Force put together a plan to fund the upgrade of between 2,500 to 5,000 missiles in the next couple of years, but was unable to find sufficient funding in the Program Objective Memorandum (POM). As a result, the Air Force scaled back initial procurement plans to about 1,200 and funded over 90 percent of the program via an exchange.

As with the airframe exchange, the concept of exchanging AGM-65G's for AGM-65K's was a response to a reduced procurement budget and the tough choices of not funding a much needed weapons upgrade program.

Taking a cue from the team's previous success with the airframe exchange agreement, Raytheon's Air Launched Strike Director, Glenn Kuller, proposed reusing older, unused Maverick hardware that could be certified as "like new," to reduce program cost. "We had to walk before we could run, and our success with the much smaller airframe exchange, was the spring board for launching into a much larger GCS exchange effort."

"We basically fell out of the POM," says Air Force Maj. Reid Goodwyn, A-10 Weapons and Tactics Program Manager at Air Combat Command. "We had been doing very well in the 2000 to 2005 POM for $130 million. We started having trouble so we suggested, 'Okay, we'll cut down to 1,200.'

"Within two weeks we went from a sure thing, seemingly, to no hope. Our Development System Manager at the time said, 'You have to get it under $50 million.' We had to figure out a way to get 1,200 missiles, which is the minimum we wanted, for under $50 million."

The team did get the figure below $50 million, according to Trinklein, "and from our perspective, that ultimately proved to be the right thing to do." However, he notes that the programmatics were not entirely painless. "In the end," says Trinklein, "we basically ended up with 1,200 missiles for $7 million." He explains that the $7 million figure, however, nearly made the

AGM-65A	First Maverick air-to-surface guided missile; electro-optical television guidance system; 125-lb. warhead.	12,559
AGM-65B	"Scene Mag" seeker-improved optics; refined target acquisition capability; increased single-pass kill probability.	13,579
AGM-65C	USAF laser missile.	Not put into production
AGM-65D	World's first operational imaging infrared (I^2R) missile, designed to meet Air Force's requirement for a night precision strike weapon with adverse weather and night operations capability.	10,943
AGM-65E	U.S. Navy laser-guided missile, first variant with 300-lb. Maverick Alternate Warhead (MAW) with selectable fusing. Increased effectiveness against high-value targets.	2,165
AGM-65F	Refinements in the I^2R seeker, guidance processor, and system software; added ship attack mode for tactical operations at sea and included heavy-weight warhead.	1,732
AGM-65G	Added system software to give Air Force capability of attacking an expanded spectrum of land and sea targets. Optimized use against high-value targets.	10,414
AGM-65H/K	Upgraded Guidance Unit with Charge Coupled Device (CCD) technology; clearer picture, longer standoff range, haze penetration; enhanced tracking software. Guidance Unit mounts on either airframe with shaped-charge warhead (65H model) or with the heavy-weight warhead (65K model). Completed operational testing.	35 "R&M 2000" units built; 1,200 GCSs initial production

FIGURE 2. **Maverick Missile Variants — 1972 to 1999**

team a victim of their own success. When they briefed their plan to senior acquisition officials at the Office of the Secretary of Defense, a comment surfaced to the effect that, "Well, since you've been able to reduce the cost of the upgrade program this much, why not make it zero and do it outside the POM?"

"The problem was, you needed money to run the program office, flight test, etc.," Trinklein explains. "And you can't run that off of exchange credits. You have to have cash to do that. A good bit of that $7 million figure is for things that can't be paid for with credit. So we got it down pretty much to the absolute minimum."

Under the recently negotiated funding arrangement, Raytheon will buy back the IR GCSs of 1,200 AGM-65G missiles and remove six electronic cards that can be used in building the CCD GCS. "We call it a CCD GCS," says Trinklein, "because it can end up on either an AGM-65H or K missile."

The CCDs will then be sold to the Air Force, according to Trinklein, for mating with the center aft sections from the AGM-65G missiles. Raytheon will use the remaining parts of the IR seekers to build new IR seekers for FMS and Direct Commercial Sales (DCS) missiles.

> " I must tell you, there are a lot of customers who buy small quantities of items, and they can save a lot of money by using this approach. But it won't work for every organization in every situation. You've got to find the right conditions. You've got to have the exchange hardware in a pristine condition. It can't be junk rusting in some bunker that you push off onto a customer. Absolutely not. It's got to meet the highest quality standards that would apply to new production. "
>
> — Glenn Kuller
> Raytheon Air Launched Strike Director

The lower CCD cost and the credit the Air Force will receive for the buy-back of the GCSs effectively funds the AGM-65K program
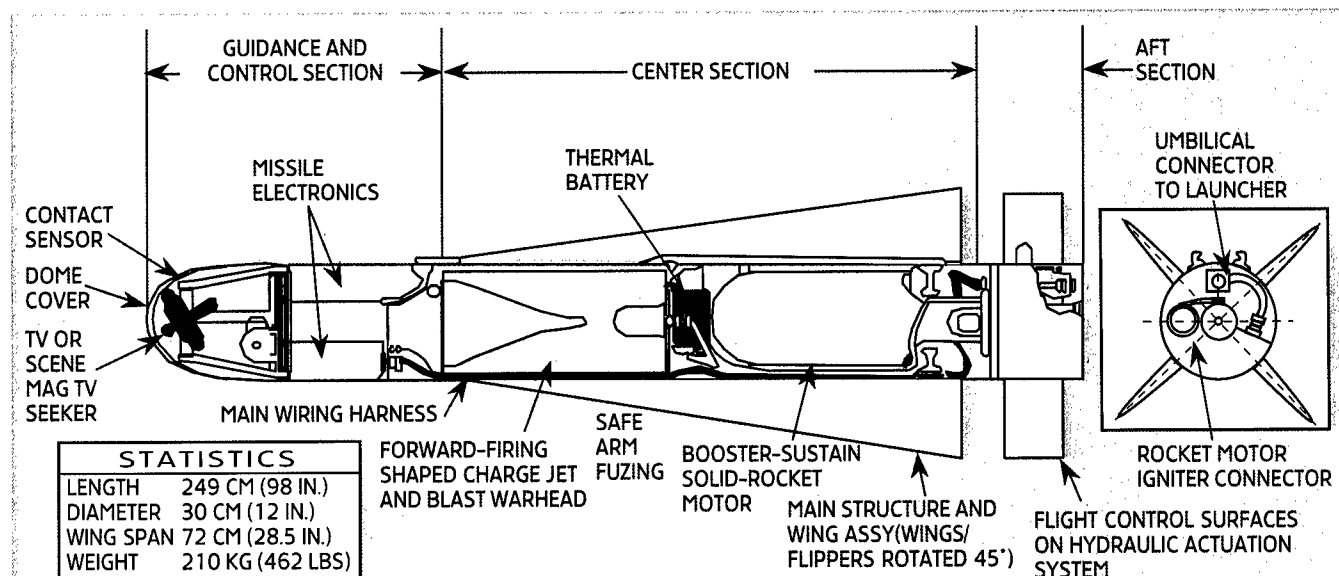
Says Kuller, "The U.S. Air Force, in essence, has become Raytheon's strategic supplier of airframes, and those airframes are then used in the manufacture of IR missiles. We would never have proposed the GCS exchange had we not been so successful on the airframe exchange. Doing the airframe exchange was painful, but it was the first of its kind for the Air Force, and certainly laid the groundwork for the GCS exchange."

Starting Point
"What we basically start with now is the AGM-65G," says Trinklein. "We pull off the GCS and send that back to Raytheon for renewal and sale. But before we give them the whole GCS, we pull six of the 12 circuit cards inside the IR version that are common to the cards used in the new seeker that we're building. And since the new seeker has only nine circuit cards, we need only purchase the three unique circuit cards for the CCD guidance units. Raytheon then gives us credit that we can use toward the new seeker."

And that credit, seemingly, is substantial. Trinklein states that the buy-back credit equates to well over 90 percent of

FIGURE 3. **Maverick Missile Arrangement**

STATISTICS

LENGTH	249 CM (98 IN.)
DIAMETER	30 CM (12 IN.)
WING SPAN	72 CM (28.5 IN.)
WEIGHT	210 KG (462 LBS)

Army AMCOM Exchanging Non-Excess Personal Property for Similar Items

Every year the Army disposes of government property that is worn out, obsolete or excess and, for the most part, receives no value from the disposal process. The Aviation and Missile Command (AMCOM), organized in October 1997 as a result of a merger between Missile Command (MICOM) and Aviation and Troop Command (ATCOM), is making creative use of the little known and used authority in recent years to exchange non-excess personal property for similar items, resulting in big dividends. By statute (see Defense Federal Acquisition Regulation Supplement [DFARS] Subpart 217.70), the DoD may exchange non-excess government property for similar items. The process is regulated by the General Services Administration.

Exchange authority provides the Army an opportunity to obtain some value for old, obsolete (but not excess) items when acquiring similar items.

Exchange transactions underway or already completed at AMCOM illustrate the savings potential:

- One contract awarded resulted in exchanging 124 old, obsolete, and non-pressurized U-21U aircraft and a warehouse full of spare parts, for a brand new C-12 aircraft. The exchange was valued at $6.2 million and avoided $5.2 million in costs associated with storage and disposal of the U-21s and associated aircraft parts.
- Initiating exchange deal for jet aircraft. Requirement is nine; funded for five; program manager to offer obsolete aircraft in partial exchange.
- Upgraded Kiowa Warrior engine; exchanged old engines for new configuration; negotiated credit for old engines.
- Program Manager for Close Combat Anti-Armor Weapons Systems exchanging TOW production equipment with Raytheon; Raytheon assumes responsibility for plant clearance and environmental cleanup costs.
- Program Managers for Night Vision and the Multiple Launch Rocket System are also investigating exchange opportunities.

In an attempt to further expand exchange authority, Office of the Assistant Secretary of the Army for Acquisition, Logistics, and Technology requested legislation to allow the Army to conduct a test program to sell non-excess equipment.

DoD subsequently granted the Army a waiver to DoD policy to allow the sale (as well as exchange) of old or obsolete nonexcess property.

What Every Program/Project Manager Should Know About Exchanges

In acquiring personal property, an agency may exchange or sell similar items and apply the allowance or proceeds as payments, in whole or in part, for the property acquired. (40 United States Code 481(c), Federal Property Management Regulation 101-46, DoD 4140.1-R, and DFARS 217.70). Until recent years, DoD was authorized only sale authority.

Past examples of the use of the exchange authority include: exchanging old diesel engines for credit during remanufacture of bulldozers, exchanging old helicopter engines for new helicopter engines during systems upgrades, and exchanging old and obsolete turret trainers for new ones. The addition of sale authority expands DoD's opportunities to obtain value for old, obsolete equipment.

If the sale or exchange authority is not used, old or obsolete equipment is generally declared excess and then is screened for possible use by other Government agencies before it is disposed of by either donation or sale. In any event, the Agency receives no value for the equipment. Sale or exchange permits the Agency to receive value by applying the sale proceeds or exchange credits toward the acquisition of similar items.

Some conditions are attached to the use of the authority (see Federal Property Management Regulation 101-46, and DoD 4140.1-R). Generally, there has to be a written administrative determination indicating the anticipated magnitude of the economic advantage to the government, that proceeds for the sale or exchange credits shall be applied in whole or in part payment for the items acquired, and if required, the property has been rendered safe or has been demilitarized. In addition, items sold or exchanged and those acquired must be similar. Items sold or exchanged may not be excess to agency requirements. Items acquired are required for approved programs. Items acquired replace and perform substantially all of the functions of the items being exchanged.

funding for AGM-65K production. Although the Air Force has only $7 million in the POM to buy 1,200 seekers, he expects that number to climb to 2,000 seekers by the time the program reaches full production. Once the U.S. Air Force is purchasing 65K missiles, there will likely be international sales of the CCD missiles, which increases production quantities and further reduces unit costs for all parties.

Ben Harris, Maverick System Program Director at Hill AFB, Utah, attributes much of the success of the AGM-65K upgrade program to the commonality of the center aft section of the Maverick family of weapons concept (Figure 3). "This allows different guidance units and aft control sections to be mated to the same Maverick configuration. The system was developed with the concept of easily removing and replacing the guidance units, resulting in a very flexible core application in other areas for future applications."

Easier the Second Time Around

As with the team's previous airframe exchange agreement, there were regulatory constraints and appropriate waivers to consider for the AGM-65K upgrade program. However, Trinklein says they were far less burdensome than the previous airframe exchange. "We've been through the process a few times, and now it's much easier."

GSA covers the subject of waivers under Title 40 U.S.C. and under the Federal Property Management regulations, according to Rick Bender from the Office of Governmentwide Policy, GSA. "You need waivers," he says, "when you deal with certain federal supply groups. For the 65K upgrade, the team needed a waiver because munitions are in Group 14." The key point to remember, according to Bender, is that "... the exchange must be for a similar item."

"You have to look at the basic requirements," says Trinklein, "and you have to have a stated need. And if you need other than a one-for-one exchange, you've got to get a separate GSA waiver. We also worked very closely with our lawyer,

Wayne Warner, to make sure we could justify everything we did."

Trinklein urges program managers not to be afraid to go to GSA for waivers. "Most acquisition people, when you tell them they need a waiver, may be somewhat intimidated. They needn't be," he says. "They [GSA] are definitely willing to work with you."

Emphasis on New

Kuller emphasizes that the Maverick AGM-65K upgrade program will reuse components that are, for all practical purposes, new — having been built between 1993 and 1996, and immediately put into storage. "These components basically never left the factory," he points out, "and they meet the definition of the FAR [Federal Acquisition Regulation] New Materials clause. In the case of these guidance units," he says, "they're very clean. The units are purged with dry nitrogen. You can take a guidance unit apart and still smell fresh glue. It's amazing."

Ben Harris, as the Maverick System Program Director at Hill AFB, Utah, manages all models of the Maverick in the sustained part of their life cycle, all FMS sales and contracts, and any issues associated with support of weapons in the field. The development agent, however, is located at Eglin AFB, Fla. All of the new systems and technologies are developed at Eglin. Once they're fully mature, they transition to Hill. Release of the missiles from deep storage at Hill was a coordinated process between Air Staff, Hill, and Eglin.

"A lot of people at Air Staff had a lot of questions about the proposed exchange," said Harris. "Even though we had worked with them on the previous airframe exchange, some aspects of the 65K missile upgrade were new concepts to them — things that were not really covered in any regulation. But those folks are very reasonable and were very willing to look at new things. It didn't take that long to convince them that if we didn't do it this way, there wasn't going to be an upgrade program. They wanted the new TV seeker for the nation's

> "The [AGM-65 K missiles] are so much better than the old TV Mavericks and greatly reduce the exposure to threats our aircrews may encounter."
>
> — Jon Trinklein
> Maverick Development
> System Manager

warfighters so much that they were willing to give up, from an Air Force perspective, 1,200 of the newest IR Maverick missiles to do this."

Determining the Value

Determining the value of the guidance unit exchange was very straightforward, according to Trinklein. The team simply went to the FY91 contract, looked up the cost of the guidance unit CLIN [Contract Line Item Number], and then escalated it. "We had it very well spelled out in 1991 what a guidance and control section itself was worth," he explains. "So we reviewed what escalation factors to use (e.g., machinery and optical parts), and that gave us a ballpark figure. In the end, we captured an appropriate mix of inflation indices and brought it up to today's price."

Says Kuller, "We saw this second 'seeker' exchange as basically 'everybody wins' — we had to come up with a method of determining the value that made sense, but that also priced the guidance units where we [Raytheon] could also sell them to FMS customers at a lower price. Because if we weren't selling the IR GCSs via FMS, we weren't going to have a CCD program. This same escalation proce-

Navy Asset Exchange Agreement

The Navy executed a unique Asset Exchange Agreement (AEA), leading to award of an $8.5 million major torpedo contract to Raytheon Naval and Maritime Systems March 26. The Naval Sea Systems Command (NAVSEA) is the contracting activity, and work is scheduled to be completed by December 2000. Under the contract – a modification to a previously awarded contract – Raytheon will supply 41 Mk 46 Mod 5A(S) torpedoes for the government of Taiwan under the Foreign Military Sales (FMS) Program.

The contract is the first award resulting from the AEA, recently negotiated between Raytheon and the U.S. Navy in conjunction with the Lightweight Hybrid Torpedo (LHT) program, [being built on the original Maverick airframe exchange]. Under the AEA (first of its kind between the Navy and industry), earlier configurations of the Mk 46 torpedo are provided to Raytheon from Navy inventory in exchange for new LHTs. Raytheon, in turn, upgrades the Mk 46s to the latest configuration for delivery to FMS customers. The AEA effectively delivers the funding required to complete the current phase of the LHT program that provides engineering development models to the Navy.

The two-speed Mk 46 Mod 5A(S) torpedo features both active and passive sonar with enhanced capabilities for shallow and deep water. With launch accessories, the torpedo can be deployed by various means: rotary- and fixed-wing aircraft, rocket-assisted launch, vertical launch, and surface vessel torpedo tubes.

dure," he adds, "will be used to determine the cost of the seeker we're buying in later years.

"This is a win-win-win," Kuller says, "in that the U.S. Air Force was able to fund their TV upgrade. Obviously, it's a win for Raytheon in that we get a new Maverick variant introduced, which holds out the carrot for additional business — that of upgrading 9,000 TV missiles overseas. That's where the true business is.

"Most of all, our FMS customers also win and will now get an IR Maverick mis-

sile," he observes, "at a more stable price because the government, as a supplier for airframes and for GCS components, is passing those airframes and components on at a stable price based on a 5,000-quantity buy; the only thing that's variable is inflation. So for FMS customers who want to come in and buy 50, most of the GCS components are priced in constant 1998 dollars."

Kuller emphasizes that Raytheon is certifying to all its customers that the AGM-65D, F, G, and K will be built to all factory production standards, that these models meet the FAR New Materials clause, that they have a full warranty, and that Raytheon stands behind them.

"I must tell you," says Kuller. "There are a lot of customers who buy small quantities of items, and they can save a lot of money by using this approach. But it won't work for every organization in every situation. You've got to find the right conditions. You've got to have the exchange hardware in a pristine condition. It can't be junk rusting in some bunker that you push off onto a customer. Absolutely not. It's got to meet the highest quality standards that would apply to new production."

You Can't Do This Because ...

Kuller says you've also got to get the right partners and be able to overcome the objections of those people that say, "You can't do this because ... Exchanges are relatively new, and many are unaware of their true potential." Time is a key element, he says. "It just takes time to work something like this through, but with the number of precedents already set, it should now be much easier."

Trinklein and Kuller predict that defense budgets will continue to be tight, and that DoD will always be looking for upgrades vs. new start programs. "There's plenty of material in the Defense inventory from the Cold War drawdown," says Kuller. "I think we're going to really get the green light to do more upgrades of this nature once DoD sees the results attained by three different Service programs that have all made it work."

> *A lot of people at Air Staff had a lot of questions about the proposed exchange... They wanted the new TV seeker for the nation's warfighters so much that they were willing to give up, from an Air Force perspective, 1,200 perfectly good IR Maverick missiles to do this.*
>
> —Ben Harris
> Maverick System Program Director
> Hill AFB, Utah

"Right now the climate is very good for innovative ideas and working these types of exchanges," according to Trinklein. "We've spent a lot of time getting the exact language in the contract so far, getting all the special clauses laid out, waivers etc., so all that groundwork has been done."

The AGM-65K team has just recently definitized the production options. But, in effect, Trinklein adds, "We're not discussing the mechanics of the exchange at all. That's not to say that we've got it all right. I'm sure we didn't — we spent a lot of months writing the language as best we could. But I'm sure there'll be some minor tweaks to the language as we go through it."

Bottom Line — Keeping the Program Alive

For those programs experiencing trouble with funding, Trinklein believes the exchange is a viable option to consider and pursue. "It's a very effective way of keeping a program alive, and it provides win-win-win opportunities for all parties."

Trinklein adds that the Maverick program may receive funds in future POMs to buy even more CCD seekers that can be used to develop "H" model Mavericks. This would not have been possible, he emphasizes, without the exchange and limited POM funding for the "K" missiles that allowed the program to move forward.

Trinklein believes in the program and is confident that the users (in this case, the warfighters) will love the new seekers. "They're so much better than the old TV Mavericks and greatly reduce the exposure to threats our aircrews may encounter."

Although some of the IR seeker components will have to be newly built, the ability to reuse some hardware will make the total seeker less expensive than it would have been otherwise. Trinklein and Kuller are convinced that the concept of basing a program on exchange vs. new starts can reduce costs and be applied on a number of ongoing DoD programs [see pp. 6-7]. Clearly, they believe, the climate is right for acquisition leaders willing to take risks and try new things.

"There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success than the introduction of a new order of things."
—Machiavelli

Editor's Note: Trinklein was reassigned in September to Edwards AFB, Calif. Those interested in further information on the GCS exchange are encouraged to E-mail **marc.trinklein@edwards.af.mil** or **Wgkuller@west.raytheon.com**.

ENDNOTES

1. Johnson, Collie J., "Maverick Airframe Team Scores Stunning Acquisition Reform Success," *Program Manager*, September-October 1998, pp. 10-18.
2. USD(A&T), Dr. Jacques S. Gansler presented Vice President Gore's Hammer Award to the Maverick Exchange Team July 7 at a Pentagon ceremony (p. 3).

PKI Moves on Board with DoN Smart Cards

DON CIO Migrates Smart Cards to the Next Step

Public Key Infrastructure (PKI) is an enabling tool for information systems and applications that will provide strong authentication so that business practices can be improved and secured. It will improve services over the World Wide Web, VPNs (Virtual Private Network), and Intranets. In short, PKI is the Department of the Navy's (DoN) security safety net for electronic commerce of the future. Elements of PKI include digital certificates and Smart Card technology.

As part of the Information Assurance Program and implementation of PKI, the DoN will begin issuing certificates in year 2000. These certificates will eventually be Class 4 (Smart Cards with internal cryptographic keys). The Smart Card uses multiple technologies (magnetic stripe, microprocessor, and bar code). These technologies will revolutionize the way DoN conducts business. The DoN will use the Smart Card as their hardware token to authenticate individual access (i.e. verifying individual's cyberID) to networks and Web sites. Once this authentication takes place, process owners can conduct a multitude of secure electronic tasks. The Smart Card will ensure the person entering the network is who he/she says he/she is, and provides authenticated back-end database access.

Using these technologies, the DoN can move infrastructure and business practices to a "Self Service Model" for servicemembers. For example, if a servicemember desires to view his/her medical record to verify its accuracy, that member will have access to the database(s), which contain the needed information.

Editor's Note: This information is available in the public domain at **http://www.don-cio.navy.mil.**

Hamre "Cuts" Op Center Ribbon, Thanks Cyberwarriors

JIM GARAMONE

ARLINGTON, Va. — Deputy Defense Secretary John Hamre presided over an Aug. 11 "virtual" ribbon-cutting ceremony here officially opening the Joint Task Force (JTF) — Computer Network Defense Operations Center.

The JTF, located at the headquarters of the Defense Information Systems Agency, is the focal point for defense of DoD computer systems and networks. Hamre called the task force an investment America must make.

"Several times I've testified and talked on Capitol Hill about the future electronic Pearl Harbor that might happen to the United States," Hamre told the standing room only crowd. "I've used that expression not to talk about surprise attacks. ... The most important message about Pearl Harbor was the way in which we had actually prepared well in advance for the war that came."

· He said the designs for the capital ships the Navy used during World War II were finished before Dec. 7, 1941. Most of the designs for Army Air Forces combat aircraft were also finished before America entered the war.

"They had the foresight to see [the war] coming and do something about it," Hamre said. "That really was the message of Pearl Harbor. It wasn't that we got hit. It was that we were ready to respond."

That's what drives the task force — DoD is not just about fighting America's battles now, but also those in the future.

"It's buying the infrastructure, in advance, that we know we are going to need at some point in time," he said. "It's [about] building the infrastructure and the resources, the talents and the skills. It's about growing that human resource needed for when that next Pearl Harbor comes."

Hamre said defending DoD's computer systems and networks is "stretching everyone's imagination." The task force achieved initial operating capacity on Dec. 30, 1998, and full operating capacity on June 30, 1999. Establishing the office has not been easy, he noted, because the personnel had to start up while at the same time, fight a cyberwar. "[DoD] has been at cyberwar for the last half a year," Hamre said. "At least we have a place now that can do something about it."

Air Force Maj. Gen. John H. Campbell, task force commander, said his organization brings an operator's eye to the table. His staff, he said, can assess what an attack is doing to a system and can tell what effect the attack would have on operations.

"The JTF is the first DoD-wide organization that can actually direct the military services to take actions to defend DoD systems and networks," Campbell said.

DoD officials have said 80-to-100 computer "events" occur daily in Department systems. Of these, about 10 require further analysis.

To date, DoD officials have no knowledge of a breach of a classified system. But the JTF is running into increasingly sophisticated attackers. Officials believe the technology for detecting and tracking violators is keeping up with the attackers.

"DoD has come a long way, and the joint task force has given DoD a mechanism that allows more coordination between the Services and Agencies that just didn't exist before," said JTF spokesperson Melissa Bohan. "The JTF ... looks across the Department and monitors computer incidents. However, this is an area for continuing research and development."

The Joint Task Force - Computer Network Defense has already made itself felt throughout DoD. It recently issued a directive instructing all the Services and other DoD organizations to complete a number of actions to improve network and system security. The actions included changing administrative and user passwords and then restarting operating systems with a "warm boot" — like using a home computer's "reset" button rather than its on-off switch.

"DoD organizations are implementing this advisory as their own management deems appropriate," Bohan said. "The JTF's Service components and the Defense Information Systems Agency's DoD Computer Emergency Response Team, and other nonintelligence DoD agencies, must comply. For the intelligence-based DoD agencies and the commanders-in-chief, this message was for coordination and information only. The change is still ongoing."

Hamre said all of DoD must become more concerned about computer security, and he thanked the members of the Joint Task Force for their efforts. "When [cyberwar] becomes really serious, the Department will be ready, thanks to your efforts," Hamre said.

Editor's Note: This information is in the public domain at **http://www.defenselink. mil/news.**

Science and Technology From An Investment Point of View

How ONR Handles Department Of the Navy's Portfolio

REAR ADM. PAUL GAFFNEY, U.S. NAVY
DR. FRED E. SAALFELD • JOHN F. PETRIK

Anyone interested in science and technology policy will recognize a familiar dilemma: Should you support basic research and hope for revolutionary breakthroughs and long-term payoffs, or do you go for evolutionary applied work that will show fast results? In some respects, the dilemma posed by this question is a false one. The Office of Naval Research (ONR) probably has as much experience wrestling with this question as any American federal institution, and we think we have an approach to science and technology that offers our ultimate shareholders – sailors and Marines – the best return on investment we can give them (Figure 1).

FIGURE 1. **Naval Science & Technology Investment Ba**
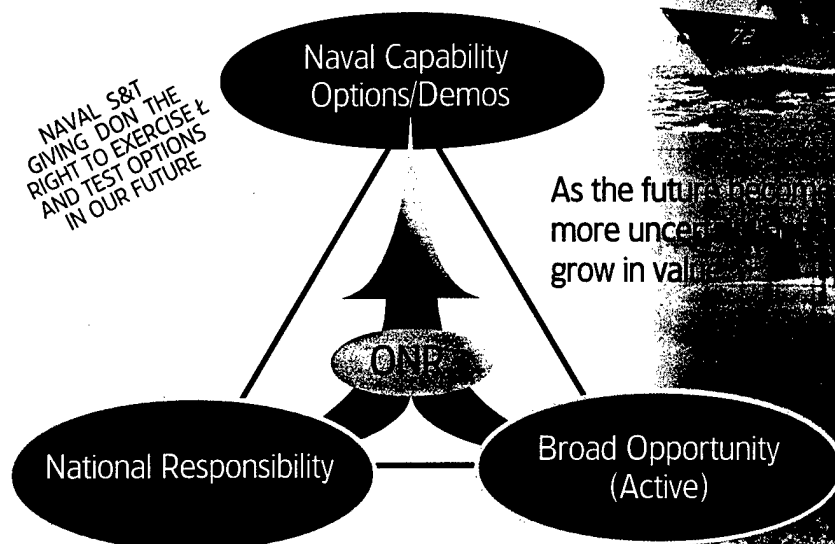
Science and Defense

Between 1946 and the founding of the National Science Foundation in 1950, ONR was the federal government's only agency whose principal mission was the support of basic research. For a brief period, university researchers were able to draw upon extensive government funding without struggling with demands that their work be justified in terms of quick benefit to the taxpayer. In those immediate postwar years, several historical accidents came together to produce a climate of public opinion in which support for pure science was relatively uncontroversial. Americans credited big science, pure science, with having done much to win the war. Indeed, even given the traditional American fascination with invention, progress, and technology, World War II forced technical and scientific advance into popular thinking about defense to an unprecedented extent. People remembered Pearl Harbor and never wanted to be surprised like that again, and saw technology as a guarantor of security.

Basic science shared the aura of victory. There was sufficient grant and contract money available as a legacy of wartime research, and academic scientists had grown accustomed to doing government work. Such ready and unproblematic support was as short-lived as it was unprecedented. It is unlikely to return soon.

The original permanent basic research establishment, ONR has evolved over the last 53 years into something more diversified and, in some respects, more accountable to its customers than its founders envisioned. The greatest change occurred in fiscal year 1992, when the Office of Naval Technology (ONT) and the Office of Advanced Tech-

nology (OAT), separate agencies that reported to the Chief of Naval Research, were folded into ONR. With the absorption of ONT and OAT, ONR was reinvented and became responsible for applied research and technology development.

Since then, ONR has worked to integrate the research it supports and to produce an investment portfolio that does justice to its several constituencies: Congress, the Fleet, the Force, industry, and universities.

The Move to Integration

As their names imply, ONT and OAT had been responsible for research that had a clear and relatively short-term payoff: hull coatings, radar masts, missile control surfaces, and the like. Development of such items falls into the Department of Defense budget activities known as 6.2 and 6.3 funding: applied research and advanced technology development respectively.

ONR, by contrast, had been largely involved with 6.1 funding — basic research. Roughly speaking, in the Department of Defense lexicon, *basic* research seeks to advance understanding of fundamental aspects of processes and properties. *Applied* research seeks ways of altering, manipulating, or using those processes and properties in such ways as may meet a specific, recognized need. Advanced technology development, finally, involves taking the results of applied research and actually fabricating things that perform some useful function, that provide some desirable capability.

Higher-numbered budget activities — 6.4 and up — no longer belong to the administrative and budgetary worlds of science and technology proper, but rather to acquisition, operations, and maintenance, among others. They lie outside the scope of this discussion, but it should be borne in mind that results from 6.1, 6.2, and 6.3 must ultimately transition projects to those other categories if the program is to succeed.

The picture the budget activities suggest when one lays them out like this, is an eminently rational one. Each level hands on the product to the next for refinement in a smooth, linear, efficient progression — a kind of assembly line that mills concepts into hardware. In fact, however, the research enterprise is so notoriously difficult to integrate in such a straightforward manner that counsel against naive optimism is common.

Nobel laureate Joshua Lederberg is quoted among research managers as advising that, "The best way to achieve scientific progress is to resist the temptation to control it."[1] Paul Nitze, as Secretary of the Navy in the mid-1960s, encountered the perennial challenge of showing that research pays by demonstrating that basic work actually generated some particular weapon, tool, or system.[2] He talked about this when he addressed ONR's 20th Anniversary celebration in 1966:

"I would note that the exercise of actually attempting to trace such parentage is often more academic than fruitful, for the trace quickly becomes dim and no rational sequence seems to prevail. This is inevitably the nature of creative ideas, basic answers, and basic data for which — once we have them — applications are seen. Yet data by themselves are sterile; it is the ephemeral idea that makes them useful."

Nitze's words were by no means a counsel of despair, and were not taken as such. ONR's assumption of responsibility for basic research, applied research, and advanced technology development suggested anew that efficiencies might be realized from vertical integration. If work supported from all three budget activities — 6.1, 6.2, and 6.3 — could become mutually supporting, all of the customers would win.

Appropriate agents of such integration are the staff scientists who serve as its project managers. They have the appropriate technical expertise and scientific credibility to administer awards and recognize quality — in the marketplace of science and technology, they are the Navy's ultimate smart buyers.

As the first step toward "reinventing" itself, ONR integrated appropriate 6.1, 6.2, and 6.3 programs to enhance connectivity within the Department of the Navy's science and technology programs.

Future naval mission capabilities were identified by senior naval management. These capabilities were analyzed, and divided into prioritized enabling capabilities by the naval requirements community. Those enabling capabilities were then analyzed by the science and technology community into five areas:

- Capability Gaps
- Capability Specifications
- Key Technologies
- Current National and International Programs

FIGURE 2. **Science & Technology Problems**

Programs below critical mass were never ready for transition
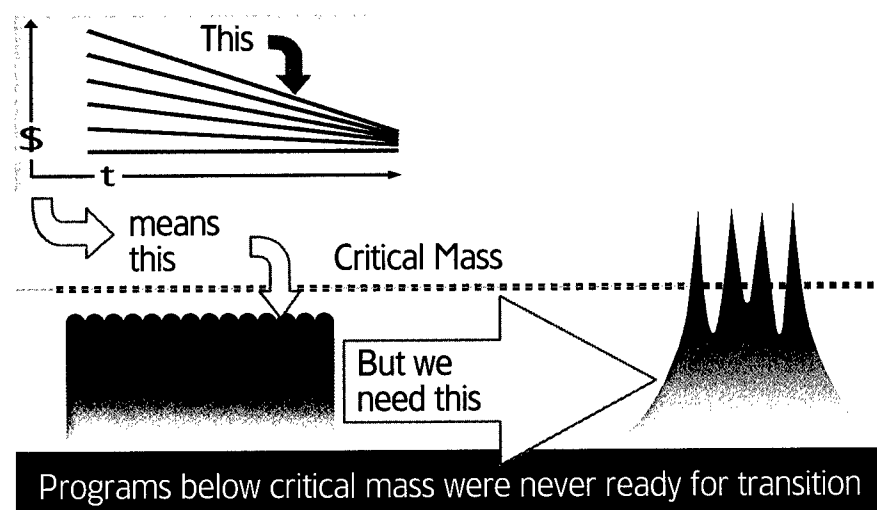
REAR ADM. PAUL G. GAFFNEY II, U.S. NAVY

Chief of Naval Research

Rear Adm. Paul G. Gaffney II became the 19th Chief of Naval Research, commanding the Office of Naval Research (ONR), effective July 12, 1996. As Chief of Naval Research, he manages the science and technology programs of the Navy and Marine Corps, from basic research through manufacturing technologies. Gaffney assumed additional duties as Director, Test and Evaluation and Technology Requirements, May 1998, and was appointed Assistant Deputy Chief of Staff for Science and Technology, Headquarters, U.S. Marine Corps, November 1998.
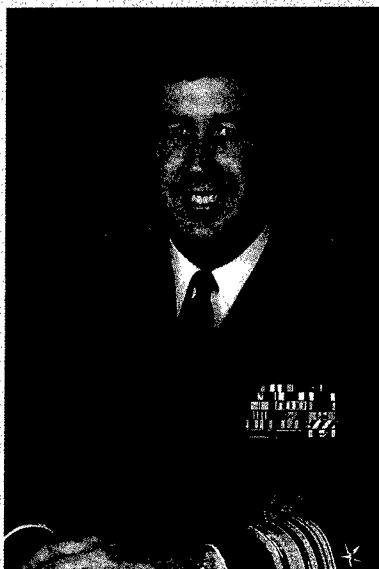
His distinguished military career spans nearly three decades and includes duty at sea, overseas and ashore in executive and command positions. His duties have included tours as: Operations Officer in *USS Whippoorwill*, a minesweeper homeported in Sasebo, Japan; Advisor to the Vietnamese Navy Combat Hydrographic Survey Team; Executive Assistant to the Oceanographer of the Navy, Washington, D.C.; Commanding Officer of Oceanographic Unit Four conducting hydrographic surveys in the Republic of Indonesia; Military Assistant to the Assistant Secretary of Defense (International Security Affairs); Commanding Officer of the Naval Oceanography Command Facility, Jacksonville, Fla.; Assistant Chief of Naval Research in Washington, D.C.; Commanding Officer of the Naval Research Laboratory in Washington, D.C.; and Commander, Naval Meteorology and Oceanography Command.

He is a 1968 graduate of the U.S. Naval Academy, was selected for immediate graduate education, and received a master's degree in Ocean Engineering from Catholic University of America in Washington, D.C. He also holds an M.B.A. from Jacksonville University. Gaffney completed a year as a student and advanced research fellow at the Naval War College, graduating with highest distinction.

- Assessment of Science and Technology Efforts Needed to Fill the Capability Gap.

These assessments were employed to build the necessary changes to the Department of the Navy science and technology program.

In order to ensure that its science and technology program meets its future capabilities' needs, the Department of the Navy has come up with a six-step decision-making process and established a four-star Department of the Navy Science and Technology Corporate Board to provide corporate management. This Board consists of the Vice Chief of Naval Operations, the Assistant Commandant of the Marine Corps, and the Assistant Secretary of the Navy for Research, Development and Acquisition.

Preserving Effectiveness — Showing Results and Making a Difference

Federal support for science and technology is no longer as flush as it was in the late 1940s. Budgets have declined in relative terms, particularly since the Vietnam War brought with it high operating costs and public disaffection with military-supported research. Even during the small renaissance the defense establishment enjoyed in the waning days of the Cold War, defense investment in research and development (R&D) had begun to be eclipsed by industry's investment in R&D. Budgets have remained tight during the retrenchments of the past decade.

One of us likes to point out that in 1999, the Department of the Navy's science and technology budget was $1.3 billion. Back in 1964 when he was in his plebe year at the Naval Academy and getting interested in a career in science and technology, that budget was a billion 1999 dollars larger — $2.3 billion. But during the last three decades, the Navy and Marine Corps have not seen a corresponding reduction in their mission requirements. If anything, expectations are higher today than they were in the early 1960s.
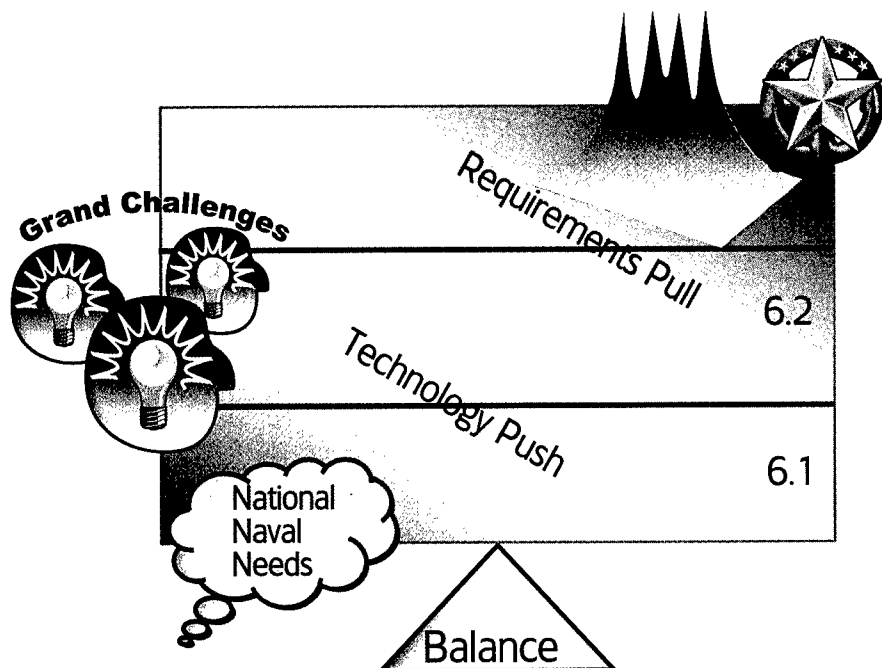
From An Investment Point of View

When resources decline, and if a number of different constituencies are still clamoring for a piece of the smaller research pot, there is a natural tendency to try to give every program's advocates a relatively equivalent but absolutely smaller portion of the available resources. Furthermore, because science and technology tend not to have an immediately visible payoff (it becomes very visible once it appears in operational systems, but those systems take time to emerge), its budget is always a tempting target for those seeking to trim expenditures. Neither of these moves makes sense from an investment point of view (Figure 2).

Instead, a sensible investment strategy would aim first and most obviously at stabilizing funding. Stable funding is essential to establishing a strong, solid 6.1 and 6.2 tech base. On this base, and only on this base, can one build an appropriately focused science and technology program that preserves a balance between longer- and shorter-term objectives (Figure 3).

Two important elements of the Department of the Navy's science and technology program that rest immediately on that tech base are the national naval responsibilities and the Science and

FIGURE 3. **Department of the Navy Science & Technology Investment Strategy — A Balanced Portfolio**

About half of the Department of the Navy's science and technology budget supports these longer-term efforts.

Delivering Capabilities

The tech base and the Grand Challenges are only half the balance. The other half of the balanced portfolio weighs in to produce capabilities for the warfighters who are the principal shareholders in the Department of the Navy's corporate science and technology effort.

An effective science and technology investment strategy must also provide prioritized naval and Marine capabilities. It should give the Department of the Navy options it can elect to exercise in response to its evolving missions, developed with the process previously described. This is where the investment focus sharpens, because research succeeds only when its resources reach a critical mass. To achieve that critical mass, one needs to identify a few crucial areas that can be pushed above critical mass (Figure 4).

When you try to fund everything, nothing gets over the bar except maybe by Brownian motion.[3] So rather than support every program with funding that falls short of the level at which research has a chance of being productive, the Department of the Navy has decided to concentrate its higher-category budget appropriations into future naval capabilities, and to have the Department of

Technology Grand Challenges. National naval responsibilities are research areas like ocean acoustics that are essential to the Department of the Navy, but areas that no other mission agency or private enterprise can reasonably be expected to support.

The Science and Technology Grand Challenges, which help ensure that the Navy and Marine Corps are unlikely to be caught short 50 years hence, are a set of very difficult but probably achievable scientific and technical challenges ONR proposes to the research community. They are intended to be visionary, designed to meet what will in all likelihood prove to be compelling needs of the "Navy and Marine Corps After Next," and to afford many participants from a broad range of disciplines multiple opportunities for exciting, creative, risky research.

The national naval responsibilities and the Grand Challenges have an irreducible requirement for the highest-quality basic and applied research, and the Department of the Navy is determined to sustain the tech base that can provide it. This tech base is also the locus of what might be called "vision" — the ability of a program officer to recognize a promis-

ing line of research even before it has been summoned by a formally declared requirement. Such vision is more than serendipity.

For example, ONR's Dr. Mike Shlesinger saw the potential importance of chaos theory many years ago and had the vision to invest in this new (and then, high-risk) area. The Navy is currently well on its way to using the work he pushed in his capacity as a program officer to solving the problem of resupplying ships in heavy weather.

FIGURE 4. **Forming Critical Mass for Science & Technology**
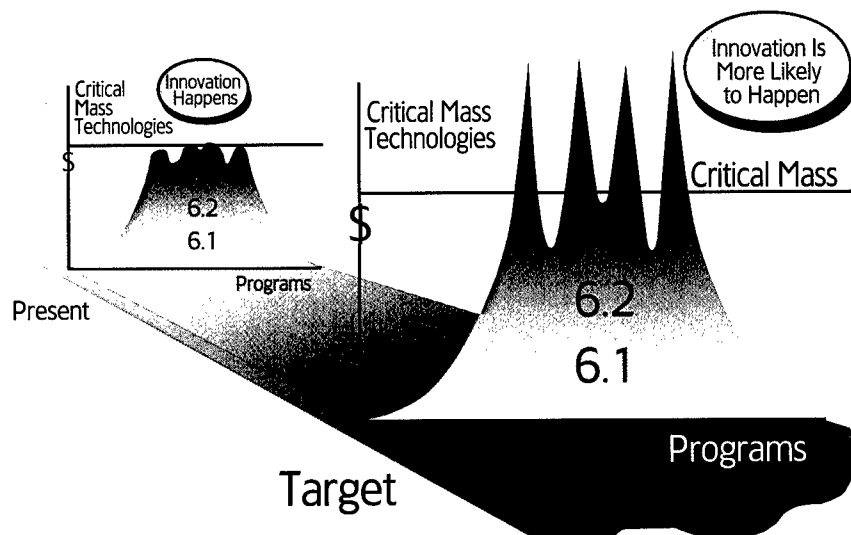
FIGURE 5. **Integrated Product Team Membership**

Acquisition Rep
Transition Lead

Requirements Rep
Chair

ONR Rep⅃
Execution Manager

S&T Resource
Sponsor Rep
Executive Secretary
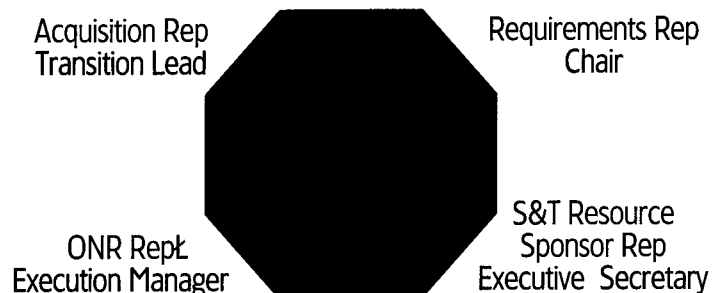
the Navy science and technology program respond to these capabilities with a series of "spike investments."

A spike investment is formally a science and technology program developed in response to prioritized, desired future Navy and Marine Corps capabilities.

Each naval capability is managed by an integrated product team (IPT) that functions like a corporate board (Figure 5). The integrated science and technology program — the "spike" — is developed by the science and technology representative to the IPT who functions like a company Chief Executive Officer producing the spike. The IPT will have the following members:

- **Chair.** The Chair comes from the Requirements Community (representing the Chief of Naval Operations, the

Marine Corps Combat Development Command, the Fleet, and the Force). The Chair leads the IPT in defining and prioritizing capability goals, and in approving the investment plan presented by the Execution Manager for the Technical Working Groups.
- **Transition Leader.** This member comes from the Acquisition Community (representing the Systems Command, the Program Executive Office, or the Implementing Community). The Transition Leader is responsible for coordinating the transition path and acquisition decision points for technologies under development.
- **Execution Manager/Technical Working Group Leader.** This member is the Science and Technology Community representative. The Execution Manager/Technical Working Group Leader heads the IPT's Technical Working Groups. These

working groups will arise after the capability priorities are set by the IPT and will then craft the investment plan for management and execution of the program. Requirements and Acquisitions representatives will be afforded membership in all Technology Working Groups. The investment plan will be approved by IPT consensus. In this role the Execution Manager will report to the IPT (acting in its capacity as the board of directors). The programmatic response (a spike) will have the following generic qualities:
- It provides significant technology options and operating concepts to meet the Department of the Navy capability.
- It has a significant budget, definite milestones and objectives, concrete deliverables, and a finite end state.
- It culminates in well-defined demonstrations (or Fleet Battle Experiments or Amphibious Warfare Experiments) of the technology options.
- **Executive Secretary.** The Executive Secretary will serve as point of contact for the IPT, promulgate the agenda, and record results of IPT decisions. The Executive Secretary will be responsible for recording progress of the IPT on a monthly basis through spike approval by the Department of the Navy Science and Technology Corporate Board, and quarterly thereafter (Figure 6).
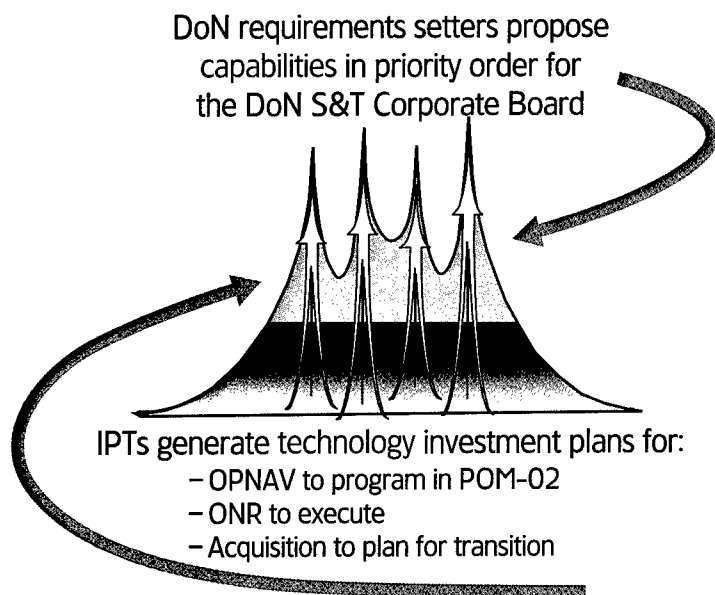
Picking Capabilities, Managing Spikes

As we noted earlier in this article, the Department of the Navy does not select capabilities in a vacuum. The IPTs nominate capabilities to the Department's Science and Technology Corporate Board. Because the requirements community, the acquisition community, and the science and technology community all contribute members to these teams, establishing an IPT for each naval capability helps ensure that the right capabilities are considered. The approval of spikes in response to these capabilities at the highest levels helps ensure that they receive the support they need if the investment strategy is to succeed.

FIGURE 6. **The "Pull"**

DoN requirements setters propose
capabilities in priority order for
the DoN S&T Corporate Board

IPTs generate technology investment plans for:
- OPNAV to program in POM-02
- ONR to execute
- Acquisition to plan for transition

The First Spikes

The first spikes reflected this approach. Initially there were three: Organic Mine Countermeasures, Destroyer Technology, and Extending the Littoral Battlespace. As the Department of the Navy continues to fill out its science and technology investment portfolio, it has generated a list of future capabilities that will either subsume or add to the existing capabilities:

- Organic Mine Countermeasures
- Information Distribution, which now includes an Advanced Concept Technology Demonstration — Extending the Littoral Battlespace
- Time-Critical Strike
- Decision Support System
- Autonomous Operations
- Littoral Antisubmarine Warfare
- Total Ownership Cost Reduction
- Missile Defense
- Platform Protection
- Expeditionary Logistics
- Warfighter Protection
- Capable Manpower.

These are candidate future capabilities, and will provide the leadership of the Navy and Marine Corps with an appropriate set of technological options

as they look to ensuring that the operating forces maintain their winning edge in the first decades of the next century (Figure 7).

Smart Buyer, Smart Investor

The Department of the Navy's new acquisition strategy depends upon the Department's being a smart buyer —or better yet, a smart investor —and it can only be smart as long as it hangs onto vital scientific and engineering expertise in places like ONR and NRL. This insight is not a new one. Secretary Nitze expressed it more than 30 years ago in his anniversary talk:

"We must, therefore, remain in a position to influence and stimulate thinking in the scientific community along lines of ultimate Navy relevance. We must have our own contacts with that community, as must —needless to say —other branches of the government."

The Department of Defense is charged by the president with helping him discharge his constitutional responsibility for the common defense. Part of that responsibility remains knowing what is needed to defend the nation, and that knowledge has to drive investment in

science and technology. Controlling the process that determines what those investments will be seems inherently part of that responsibility.

It is difficult to imagine circumstances under which government might abdicate these responsibilities to industry. That is not because industry is unpatriotic, grasping, or untrustworthy — it is none of these things. It is rather because the executive branch is responsible for national defense, and that cannot be outsourced. Moreover, the government is supposed to speak for America. Industry inevitably and rightly has a narrower perspective, yet one that should fit consistently into the larger context of national interest. So ultimately, the Department of the Navy cannot delegate its research portfolio.

As the manager of the Department of the Navy science and technology program, ONR will continue to ensure that the portfolio includes the best available mix of investment partners and research performers. And since our ultimate shareholders are sailors and Marines, the return on investment we look for in naval science and technology is not *profits*, but *capabilities*.

Editor's Note: The authors welcome questions/comments on this article. Send an E-mail to **petrikj@onr.navy.mil.**

FIGURE 7. **The New Process**
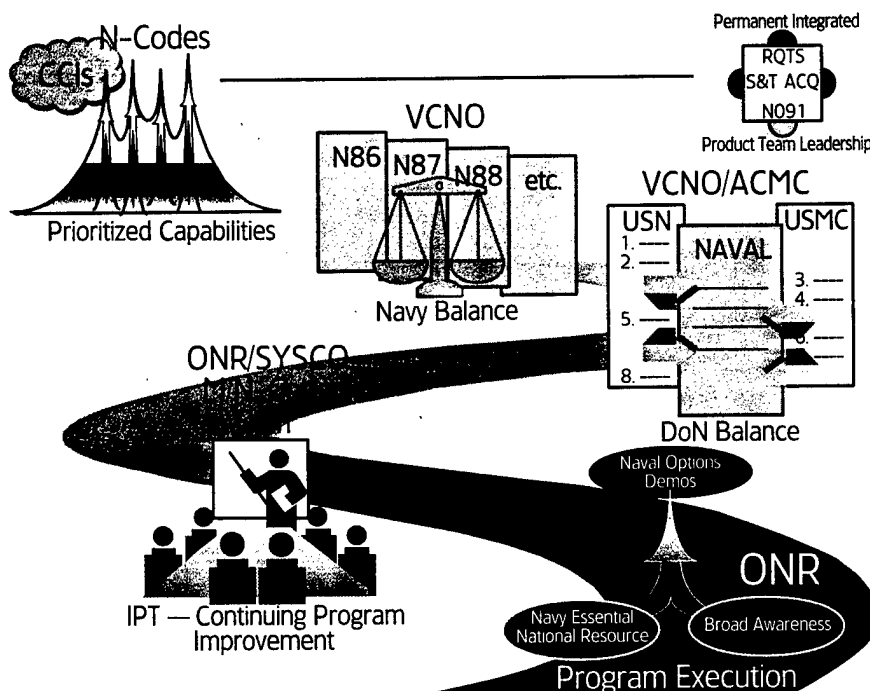
REFERENCES

1. Joshua Lederberg won The Nobel Prize in Physiology/Medicine in 1958 for his discoveries concerning genetic recombination and the organization of the genetic material of bacteria.

2. President John F. Kennedy appointed Paul Nitze the 57th Secretary of the Navy in November 1963, a position he held until July 1967.

3. Brownian Motion is constant, erratic movement of tiny particles suspended in a fluid/gas, a phenomenon discovered in 1827 by British botanist Robert Brown.

Have You Talked to *Your* Computer Lately?

TECH. SGT. MARK KINKADE, U.S. AIR FORCE

HURLBURT FIELD, Fla. — The way Air Force Maj. Eben Hughes sees it, the days of double-clicking a computer mouse are numbered.

Armed with little more than a $70 headset and commercially available speech recognition software, Hughes and the Command and Control Battlelab here are trying to replace the computer mouse with the microphone.

Speech recognition technology is one of a handful of initiatives on display at Joint Expeditionary Force Experiment (JEFX) '99, a multiforce, multinational "laboratory" charged with evaluating new technology as well as new command and control procedures for the Air Force of the 21st century. More than 700 people were gathered at Hurlburt to participate in the experiment.

The speech recognition experiment will help determine if the Air Force can use software that understands human speech to eliminate keystrokes on a keyboard or dragging and clicking on menus with a mouse.

"This technology is already out there," said Hughes, chief of the speech recognition initiative. "Industry is going to make this part of everyday use. You're going to see it in the home. We're trying to stimulate the minds of our leaders to consider the possibilities the technology can bring."

In a series of hands-on demonstrations with visitors and other experiment participants, Hughes showed how speech recognition speeds up the process of building an air tasking order. Essentially, the software understands simple commands to fill out the tasking order. For example, the command "Assign Bravo 00102 to 48th Fighter Wing" tells the computer to fill a blank assigning an aircraft to the fighter wing.

The software recognizes between 500 to 2,000 words, said Air Force Lt. Col. Phil Romanowicz, chief of the C2 Battlelab's Initiative Management division. Unlike some commercial software, the speech recognition programs on display here don't rely on vast dictionaries of words to convert dictation. In fact, the software is a picky application and doesn't take dictation.

"With dictation software, the program takes up to 40 minutes to teach the computer speech patterns and specific words," he said. "With this, the train-up time was zero minutes."

Preliminary studies during various "spiral" experiments leading to the JEFX showed speech recognition trimmed time spent on building the tasking order by about 7 to 9 percent; however, the chief benefit may lie in saving training time.

"The guys (testing the application) perceived it as faster," Romanowicz said. "It takes less time to learn the process of building the tasking order, making it more user friendly. That means less training time."

Also, the technology could help reduce the number of people working on tasking orders.

"Right now, it takes 12 to 15 aircrew (members) to build the tasking orders," Romanowicz said. "That's a lot of bodies out

of cockpits. This technology could help us reduce that by three or four people, putting more people in aircraft."

The idea of incorporating speech recognition in daily Air Force operations came from efforts to use the technology in aircraft. Hughes said an engineer friend who had been working on incorporating speech programs in cockpits for more than a decade suggested trying it in the workplace. Hughes started doing research, and soon had the technology as an initiative for the JEFX experiment.

During the experiment, speech recognition is a Category 3 initiative, meaning it isn't being used in scenarios testing technology that could soon reach the field; however, both Romanowicz and Hughes expect to see people talking to their computers in JEFX 2000.

"It has matured much quicker than we expected," Romanowicz said. "We didn't know it would interface so smoothly. Industry has driven this technology and we're seeing the fruit of that today."

Editor's Note: This information is in the public domain at **http://www.af.mil/news.**

Establishing a Strategic Alliance

An Invaluable Addition to the PEO/PM Tool Kit

REAR ADM. WILLIAM V. CROSS, U.S. NAVY
REAR ADM. JOSEPH A. CARNEVALE, U.S. NAVY

Rear Adm. William V. Cross, U.S. Navy
PEO for Aircraft Carriers

Cross is the PEO for Aircraft Carriers, Naval Sea Systems Command (NAVSEA), Crystal City, Va. A 1967 graduate of the U.S. Naval Academy and Distinguished Graduate of the Naval War College, Cross is qualified as a weapons system acquisition manager and nuclear propulsion engineer. A combat pilot who flew the F-4 Phantom in over 175 combat missions over North Vietnam, Cross was selected for test pilot training in 1972 and subsequently served as a test pilot instructor. His operational assignments include command of a fighter squadron; an amphibious assault ship, the *USS Inchon*; the nuclear aircraft carrier *USS Dwight D. Eisenhower*, Carrier Group Six; and the America Battle Group. He is currently attending the Executive Program Managers Course, DSMC.

Rear Adm. Joseph A. Carnevale, U.S. Navy
**PEO for DD-21**

Carnevale is the PEO for DD-21, NAVSEA. Graduating from the University of Massachusetts in 1971, he received his commission through Officer Candidate School at Newport, R.I. After completing deployments to Vietnam and the Sixth Fleet, Carnevale joined the Engineering Duty Officer community. He graduated from Massachusetts Institute of Technology (MIT) in 1980 with a master's in Naval Architecture and Marine Engineering and an Ocean Engineer's Degree. Carnevale has participated in the acquisition and construction of six ship classes, including Supervisor of Shipbuilding, Pascagoula, Miss., and Executive Assistant to the Assistant Secretary of the Navy (Research, Development and Acquisition). He is a graduate of PMC 96-1, DSMC.

The Defense Reform Initiative challenges the acquisition community to become more efficient and effective in providing systems and support for the warfighter. One readily available tool for the Program Executive Officer (PEO) and the Program Manager (PM) is to establish a "strategic alliance" as a means of leveraging scarce resources across programs. The authors – the PEO for Aircraft Carriers and the PEO for DD 21 – have established such an alliance. This article tells how their sharing of ideas and mutual support is producing significant benefits to the U.S. Navy.

Every PEO and PM faces a myriad of challenges and opportunities that often cut across program lines. As PEO for Aircraft Carriers and PEO for DD-21, we realized through informal discussions that we face many of the same challenges and opportunities.

We also recognize that our resources are limited and that the expectations of our
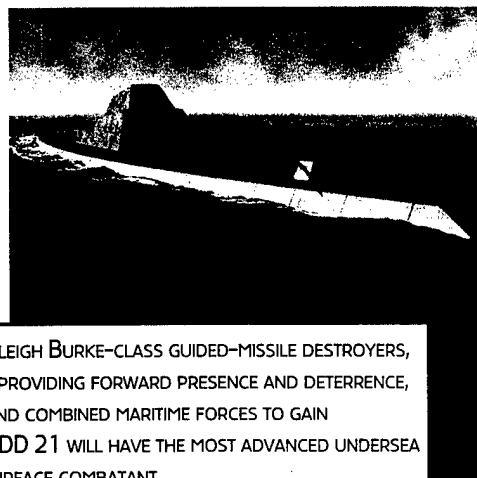
ARTIST'S CONCEPT OF THE DD-21. LIKE TODAY'S ARLEIGH BURKE-CLASS GUIDED-MISSILE DESTROYERS, DD 21 WILL BE A MULTI-MISSION SHIP, CAPABLE OF PROVIDING FORWARD PRESENCE AND DETERRENCE, AND OPERATING AS A VITAL PART OF NAVAL, JOINT, AND COMBINED MARITIME FORCES TO GAIN BATTLESPACE DOMINANCE IN LITTORAL OPERATIONS. DD 21 WILL HAVE THE MOST ADVANCED UNDERSEA WARFARE COMBAT SYSTEMS EVER INSTALLED ON A SURFACE COMBATANT.
Image courtesy United Defense
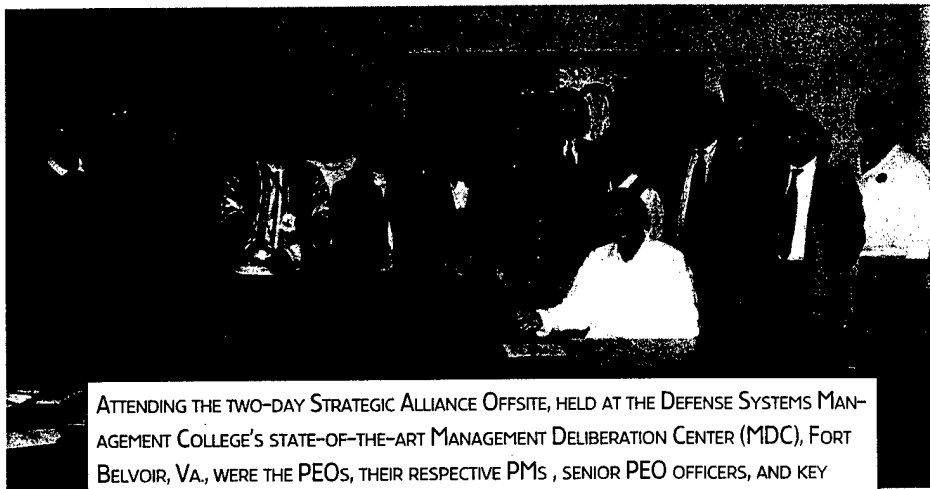
ATTENDING THE TWO-DAY STRATEGIC ALLIANCE OFFSITE, HELD AT THE DEFENSE SYSTEMS MANAGEMENT COLLEGE'S STATE-OF-THE-ART MANAGEMENT DELIBERATION CENTER (MDC), FORT BELVOIR, VA., WERE THE PEOS, THEIR RESPECTIVE PMS, SENIOR PEO OFFICERS, AND KEY PROGRAM OFFICE STAFF MEMBERS. SEATED FROM LEFT: NAVY REAR ADM. JOSEPH A. CARNEVALE, PEO FOR DD-21, NAVSEA; NAVY REAR ADM. WILLIAM V. CROSS, PEO FOR AIRCRAFT CARRIERS, NAVSEA.

warfighting customers are high. These realities convinced us to hold a two-day meeting — a Strategic Alliance Offsite we called it — in order to explore the potential for more formal cooperation.

People First

The Defense Systems Affordability Council (DSAC) articulates three top-level goals of the Department in its 1999 study, *Into the 21st Century — A Strategy for Affordability*: fielding quality systems quickly and supporting them responsively, lowering Total Ownership Cost (TOC), and reducing the overhead costs of the acquisition and logistics infrastructure.[1] Each PEO and PM is responsible for these goals within their respective purview.

In this regard, we believe much may be gained not only by collaborating on processes and products, but also by sharing the ideas and knowledge of the people in each organization.

We found that comprehensive, up-front planning was absolutely critical to the

USS George Washington (CVN 73)

success of our cooperative effort. It established mutual expectations, ensured our time was spent productively, and allowed our senior staff members the opportunity to get to know each other prior to meeting together for the first time.

Those attending our offsite were the PEOs, their respective PMs , senior PEO officers, and key Program Office staff members. We were extremely fortunate in our choice of locations — the state-of-the-art, computer-aided Management Deliberation Center (MDC) at the Defense Systems Management College (DSMC), Fort Belvoir, Va. We also received first-rate support from DSMC's former Commandant, Navy Rear Adm. Leonard Vincent and the college faculty, whose management expertise and familiarization with the MDC were essential to our proceedings.
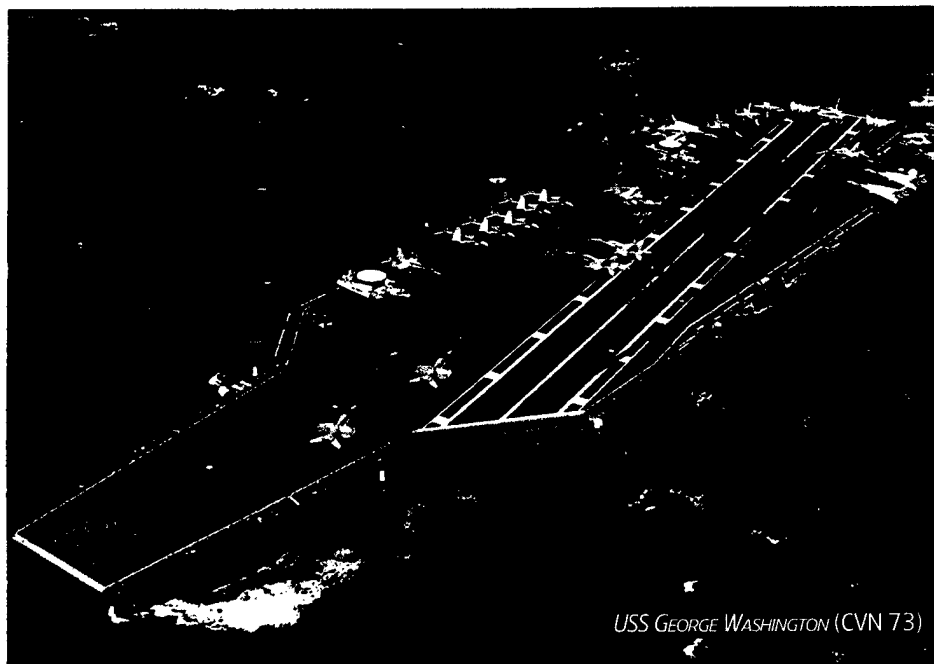
Once we assembled the right people, booked the superb MDC facility, and arranged for support of our efforts, we were ready for the first day. Day 1 began with short remarks about each other's expectations and why we felt the offsite was important to our future success. The bulk of the offsite featured both combined briefings and small group meetings, offering the PEO staffs the opportunity to meet independently and resolve "in house" concerns. Initial presentations included general program overviews intended to establish mutual understanding.

As part of their extensive preliminary work, our staffs identified and coordinated briefings in specific technical and business areas that held the most promise for mutual benefit. These included the use of the Integrated Data Environment (IDE); acquisition strategy and acquisition reform; Combat Systems Integration issues; TOC reduction; Smart Ship initiatives to reduce workload levels; Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) initiatives; and the leveraging of research and development efforts.

Formalizing Our Commitment

As a culmination of our strategic alliance offsite, we formalized our commitment in a Memorandum of Agreement (MOA), which articulated the purpose, scope, background, responsibilities, schedule, and agreed-upon focus areas. Prior to the offsite, we drafted and reviewed the MOA, then made final modifications online, using the unique computing capabilities of the MDC. Signed by each PEO, this MOA is the charter document for our future efforts.[2]

Our newly formed Strategic Alliance, now recognized by the Chief of Naval Operations, establishes a new high-water mark for PEO-to-PEO relationships in general, and between the surface combatant and aircraft carrier acquisition communities in particular. The alliance gives each PEO another "tool in the tool kit" for effectively leading these important efforts. We have great expectations that this key undertaking will produce significant benefits to the Navy — in terms of cost savings as well as improved warfighting capability — for years to come!

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Vice President Gore Reveals New Study Showing Widespread Effect of Information Technology On Today's Economy, Society

Also Announces U. S. Will Partner with 10 Developing Countries to Provide Technical Assistance, Expand Internet Services

Denver, CO — Vice President Gore released today a new report — The Emerging Digital Economy II" — that shows that information technology is fundamentally changing the way Americans work, live, communicate, and play.

"Six-and-a-half years ago, there were just 50 Web sites around the world. Today, there are more than 6 million," Vice President Gore said. "Today, information technology is changing the way we live, learn, work, and shop — and its most lasting impact is just emerging. This report finds that since 1995, even though information technology industries make up less than one percent of all retailers, they account for fully one-third of our nation's economic growth."

Electronic commerce (business transactions on the Web) and the information technology (IT) industries that make "E-commerce" possible are growing and changing at breathtaking speed. Today's report — prepared by the Commerce Department — documents how E-commerce and IT are changing America.

Specifically, the report found:
- **E-commerce is growing much faster than the most optimistic projections.**
  Growth in the available measures of E-commerce has far outpaced even the most optimistic projections. For example, in early-1998 experts estimated that Internet retailing would reach $7 billion by the year 2000. By late-1998, online retail sales reached between $7 billion and $15 billion. Even with this rapid growth, however, E-commerce still represents less than 1 percent of the retail economy.
- **IT-producing industries account for more than one-third of America's strong economic growth.**

The IT-producing industries that make E-commerce possible — for example, producers of computer and communications hardware; software; and services — play a critical role in our growth process. Between 1995 and 1998, IT producers, while accounting for just 8 percent of total GDP [Gross Domestic Product], contributed on average more than one-third of the nation's real economic growth.
- **IT-producing industries reduce overall inflation. In both 1996 and 1997 (the most recent data available), rising quality and falling prices for IT goods and services cut overall inflation by 0.7 percent.**
  By helping to keep inflation under control, IT industries help keep interest rates low and investment high. As Fed Chairman Alan Greenspan said [June 17, 1999], this "prolonged period of price stability does help to foster economic prosperity."
- **Businesses are investing in IT at unprecedented rates.**
  Under Vice President Gore's leadership, productive business investment has grown at a double-digit pace every year since 1993 — the first time on record the U.S. has achieved six consecutive years of double-digit business investment growth. These new investments will help sustain strong economic growth in the future. IT has been a driving force in this investment boom. From 1993 to 1998, IT investments accounted for more than half of the growth of all real business equipment spending.
- **By 2006, almost half of American workers will be employed by industries that are either IT producers or intensive users of IT.**
  The emerging digital economy is raising the demand for highly paid, core IT workers (e.g., computer scientists, engineers), creating new IT-related occupations, changing the skill requirements for

June 21, 1999

many non-IT jobs, and raising the minimum skill requirements for many other jobs. In 1997, IT-producing industries added 350,000 jobs, a one-year increase of 7.7 percent as compared to average employment growth of about 3 percent. By 2006, almost half of all American workers will be employed by industries that are either major IT producers or intensive users of IT.

- **IT workers earn 78 percent more than other workers — and the pay gap is growing.**
  In 1997, workers in IT-producing industries earned on average $52,920 or 78 percent more than the average of $29,787 earned by all workers. The pay gap between IT workers and other workers has been growing: In 1989, this pay gap was 56 percent, with IT workers earning an average of $34,561 and all other workers earning $22,184.

- **IT industries are achieving extraordinary productivity gains.**
  From 1990 to 1997, IT-producing industries increased their value-added per-worker (measured on a Gross Product Originating basis) at a robust annual rate of 10.4 percent, compared to the national average of 1.4 percent.

In his remarks, the Vice President also announced that the United States will partner with 10 developing countries for the "Internet for Economic Development," an initiative designed to increase Internet access and use in developing countries throughout the world. Those countries are Guatemala, Jamaica, Bulgaria, Egypt, Morocco, Ghana, Guinea, Uganda, South Africa, and Mozambique.

Through this initiative, these countries will collaborate with the U.S. government, the private sector, multilateral organizations, and non-profits to help them use electronic commerce and the Internet as tools for economic development.

Specifically, the initiative will seek to:
- Provide regulatory and technical advice and training to assist countries in creating an attractive, pro-competitive environment where the Internet can flourish.
- Mobilize multinational organizations, NGOs [non-government organization], and the private sector to help spur the deployment of advanced information infrastructure to remote areas.

- Provide E-commerce training to local regulators, entrepreneurs, and artisans.
- Foster the deployment of specific Internet applications such as micro-E-commerce, telemedicine, distance education, and improved access to government services.

The U.S. actively encourages other interested countries to join in this initiative. This initiative is part of a broad effort by the U.S. to foster development of the information industry worldwide. In that regard, the World Trade Organization, on Friday June 25, [held] a special session addressing sources and needs of telecommunications technical assistance. This meeting was initiated by the U.S. in support of developing countries' efforts to reform regulations in order to promote private investment in telecommunications and electronic commerce.

The World Bank will be an active partner in the Internet for Economic Development initiative, supporting various pilot projects in the selected countries.

In addition, the U.S. Telecommunications Training Institute (USTTI) has committed to:
- Give priority to applicants from these countries to participate in its tuition-free industry/government training courses.
- Invite these countries to participate in special training sessions focusing on E-commerce and World Radio Conference 2000 policy issues.
- Work with leaders from these countries to shape special training sessions in year 2000 that specifically meet their needs as they adopt E-commerce as a tool for economic development.
- Coordinate special training outreach through USTTI's corporate members for officials from these countries.

USTTI is a non-profit joint venture between leaders of the U.S. communications industry and key government officials, which provides tuition-free communications training to professionals from the developing world.

Editor's Note: This information, orginally published by the Air Force Knowledge Management Team, is in the public domain at **http://www.af.mil/news** on the World Wide Web.

Joint Interoperability Certification

What the Program Manager Should Know

GORDON DOUGLAS • PHUONG TRAN

Would you say that a program manager whose system meets performance requirements, is on schedule, and within budget, is in good shape? If your answer is "yes," you might be wrong if the system isn't interoperable with its surrounding systems.

Sharing Information — "They Should Have Known"

Every time the wrong helicopter is shot down or the wrong target is bombed critics say, "They should have known." In some cases the critics are right. Some people did know, but the right information didn't get to the right people at the right time. That often happens when systems don't share information and interoperate efficiently and effectively across Service or Agency boundaries.

The Chairman, Joint Chiefs of Staff has directly attacked this problem with a joint interoperability certification process that applies to every Department of Defense Command, Control, Communications, Computers and Intelligence (C4I) system and Automated Information System (AIS).

Systems that integrate this process into their overall development and testing smooth the way into the field and provide the best support to their users. Programs that discover interoperability problems too late may suffer delays, cost overruns, or worst of all, contribute to deadly mistakes at critical times (Figure 1).

Program managers need to understand the process and use it to their advantage. To understand the process, a few basic questions need to be answered.

Q

What is interoperability?

A

Simply put, interoperability is systems working effectively together. Joint Pub 1-02[1] uses a slightly more elaborate definition: "The ability of systems to provide services to, and accept services from, other systems and to use the services exchanged to enable them to operate effectively together."

Q

What is interoperability certification?

A

Interoperability certification is the process of ensuring that a system meets
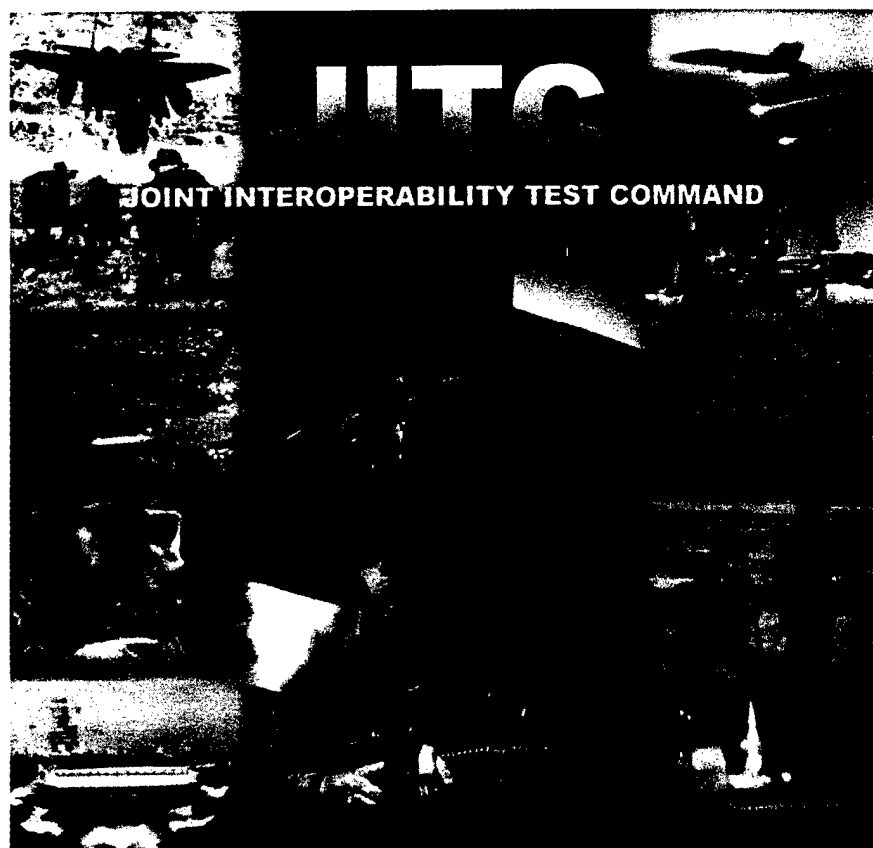

FIGURE 1. **JITC — Ensuring Battle Ground Doesn't Become Testing Ground**

Douglas is an operations research analyst for the Joint Interoperability Test Command at Fort Huachuca, Ariz. He is a graduate of the University of Arizona, and has more than 20 years of military, government, and private industry experience in research, engineering, and test and evaluation. He participated in the test programs for the Global Command and Control System, the Defense Message System, the Global Positioning System, and the Mobile Subscriber Equipment, among others. *Tran* is a graduate of the University of Arizona, holds a B.S. in Electronics Engineering, and has over 13 years' federal service in the test and evaluation field. She is currently Team Leader of the Focus Center for the Warfighter Support Division at the Joint Interoperability Test Command.

the joint interoperability requirements of its users. It includes the collection of the data necessary to determine whether or not the system conforms to applicable interoperability standards and can effectively exchange all required information with all other required systems.

Q

Why certify for interoperability?

A

Certification is the conclusion an independent source reaches that assures the warfighter that the Commander in Chief, Service, and Agency systems can interoperate in a joint team.

Q

Who certifies that a system is interoperable in a joint environment?

A

The Joint Interoperability Test Command (within the Defense Information Systems Agency) has responsibility for certifying joint interoperability of all DoD systems.

Q

What systems need to be certified?

A

All C4I systems and AIS that produce, use, or exchange information in any form and exchange information between Services, Agencies, or countries.

Q

When should systems be certified?

A

All systems must be certified before they are fielded, usually before Milestone III or Initial Operating Capability. Fielded systems must be certified every three years or after a major modification. The system proponent should contact us early in the acquisition program to ensure that certification is timely and cost effective.

Q

What does certification involve?

A

We follow the processes outlined in Chairman, Joint Chiefs of Staff Instruc-

tion (CJCSI) 6212.01A, *Compatibility, Interoperability, and Integration of Command, Control, Communications, and Computer Systems,* to perform our joint interoperability test and certification mission.[2] This document is currently being updated to mesh with recent changes to the requirements generation process and to ensure that interoperability certification is addressed during the acquisition of all C4I systems, regardless of acquisition category. Figure 2 depicts the four-step process we follow to implement joint certification.

Identification of All Joint Interoperability Requirements

We begin identifying requirements from traditional sources such as Mission Need Statements (MNS) and Operational Requirements Documents (ORD). But MNSs and ORDs are often outdated and incomplete. The requirements generation process has been strengthened with the publication of a revised CJCSI 3170.01A, *Requirements Generation System,* which serves to improve the identification of interoperability requirements.[3] This updated document mandates identification of interoperability Key Performance Parameters (KPP) for Capstone Requirements Documents and ORDs, and defines time-phased requirements in support of time-phased acquisitions.

To complete the requirements picture, we examine how the system will fit into the present and future joint operational networks and architectures by active participation in exercises and contingencies.

User Requirements Confirmation

Once identified, we develop a joint interoperability requirements matrix and confirm it with the appropriate operational command or Agency. This joint interoperability requirements matrix is

then coordinated with the program office. We will test to the user requirements with the understanding that any discrepancies between the user and contractual requirements may require resolution at higher level.
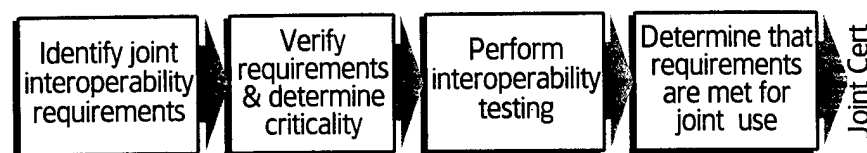
Interoperability Data Collection

We then gather joint interoperability data from appropriate test events and sources as agreed with the system proponent. While each C4I system or AIS presents unique challenges, we can divide interoperability assessments into two basic categories: information transport and information processing.

The interoperability issue with information transport is the complete, accurate, and timely transfer of information from one system to another. The objective of this assessment is to determine the ability of the system to send and receive information in its intended operational environment.

As an example, we assess tactical communications equipment in terms of supporting a notional Joint Task Force (JTF). While the Services acquire tactical communications equipment with Service requirements, our focus is determining the degree that this equipment interoperates within the overall communication requirements of the JTF, i.e., the capability of the system to transfer data, voice, imagery, and the system management functions required for JTF operations.

Interoperability assessment of information processing requires more than bits, bytes, and protocol testing. We assess the system end-to-end to determine how one system interacts with other systems in order to determine if they can exchange information and services in a joint environment. The objective of this testing is to assess the ability of the system to process and present information

FIGURE 2. **Joint Certification Process**

Identify joint interoperability requirements → Verify requirements & determine criticality → Perform interoperability testing → Determine that requirements are met for joint use → Joint Cert

to and from other systems in the joint architecture.

Determination of the Status of Interoperability

All relevant data are used to determine the level of interoperability of a system and all its interfaces. The determination is published in a letter of certification sent to the program office. Copies are also sent to the Joint Staff; Director, Operational Test and Evaluation (DOT&E); and appropriate Service.

Q

How do you get and keep your system certified?

A

- Contact us as early in system development as possible.
- Coordinate all testing with us, so joint interoperability can be integrated into the test program schedule.
- Consult us on changes in requirements or capabilities in order to keep certification status current.

Q

What will JITC do to help get your system certified?

A

When a program manager contacts us early in the acquisition program, we will:

- Assist in identifying joint interoperability requirements during the concept/design phase of the program.
- Ensure that interoperability is built into the system from the start.
- Plan for the most efficient use of resources.
- Assist the program manager in identifying solutions to interoperability problems necessary to get the system certified.

We also have a range of tools available for system assessments. We have laboratories and networks for testing virtually all types of C4I systems and AISs, and have extensive recent experience in the following areas:

- Defense Information System Network (DISN)

While the Services acquire tactical communications equipment with Service requirements, our focus is determining the degree that this equipment interoperates within the overall communication requirements of the JTF.

- Defense Message System (DMS)
- Defense Red Switch Network (DRSN)
- Electronic Commerce/Electronic Data Interchange (EC/EDI)
- Global Command and Control System (GCCS)
- High Frequency Radio
- Joint Tactical Data Link (JTDL)
- National Imagery Transmission Format Standard (NITFS)
- Asynchronous Transfer Mode (ATM)
- Security Management Infrastructure (Public Key Infrastructure [PKI] and Electronic Key Management System [EKMS])
- Strategic and Tactical Switching and Communications
- Ultra High Frequency (UHF) Demand Assigned Multiple Access (DAMA)
- Year 2000.

We also have a variety of specialized interoperability analysis tools, including interPRO, INTELpro, and the Joint Operational C4I Assessment Team (JOCAT).

INTERPRO

InterPRO is an Internet-based joint interoperability analysis support tool developed to support Joint Theater Air and Ballistic Missile Defense systems users. It identifies interoperability deficiencies

and supports connectivity, Information Exchange Requirement (IER), and detailed interoperability analyses. The interoperability deficiencies identified in interPRO are also linked to the JITC's Trouble Report database, where detailed information about the actual problems is documented.

INTELPRO

INTELpro is similar to the interPRO; however, it is designed to support intelligence systems users.

JOCAT

JOCAT is a worldwide deployable team consisting of equipment and personnel with the capability and expertise to provide on-site interoperability analysis and support during field exercises and real-world contingencies. The JOCAT monitors the Joint Data Network (JDN); selected voice networks; Tactical Information Broadcast Service (TIBS); Tactical Receive Equipment and Related Applications (TRAP) Data Dissemination System (TDDS) network; Joint Planning Network (JPN); and exercise Distributed Interactive Simulation (DIS) networks.

Further, it provides automated methods to identify items of interest and interoperability anomalies for immediate analysis. JOCAT's automated methods process the data collected at various interfaces to provide valuable and timely feedback.

Nonparticipation in the Certification Process

Our nation's forces deploy and execute their assigned missions as members of Joint Task Forces. Operational networks clearly reflect this joint force composition and carry with them the requirement to exchange information across Service boundaries. The Service-sponsored process through which systems have been procured, and the rapid acquisition of readily available and low-cost C4I technologies, have posed challenges to ensuring that all systems are capable of operating when placed in a joint environment. C4I capabilities have been fielded that enhance the capabilities of the specific user but may degrade

overall system performance when viewed from an integrated joint perspective.

The program managers or sponsors of these noncertified C4I system procurements did not participate in the joint certification process. Updates to the requirements generation and interoperability certification process instructions noted earlier, coupled with the emerging role of the Commander in Chief, U.S. Atlantic Command as the Chairman's advocate for interoperability, will establish a means to overcome these challenges and better enforce the requirement for C4I systems to participate in the joint certification process.

Assurance of Interoperability For Nation's Warfighters

JITC, as the sole joint certifier of these systems, will continue to play an active role in the interoperability requirement and testing certification process. The ultimate beneficiaries will be the warfighters who will be provided with higher levels of assurance that the systems procured for their use will interoperate.

Editor's Note: Two documents are available at http://jitc.fhu.disa.mil/testing.htm that provide additional insight into the joint certification process: *JITC Interoperability Assessment* contains the overall concept of interoperability and the significance of joint interoperability; *JITC Certification Process* provides a description of the JITC certification process model used throughout a system's life cycle. To obtain more information about the joint interoperability certification process, please contact 1-800-LET-JITC or visit the JITC Web site at http://jitc.fhu.disa.mil on the Internet.

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3. CJCSI 3170.01A, *Requirements Generation System*, August 10, 1999.

Inside DSMC

Chad Steven Campbell has been selected as the Western Regional Center Operations Officer. A graduate of the Marine Corps Noncommissioned Officers Course, Campbell joins the Western Region staff after serving a four-year tour with the U.S. Marine Corps as a basic rifleman and scout team leader. His most recent assignment was at the Marine Corps Air Ground Combat Center, Twentynine Palms, Calif., where he served as the administrative manager for the battalion chaplain with collateral duties as an assistant to the battalion executive officer.

New DSMC Guidebook Available!

A new text on *Systems Engineering Fundamentals* (October 1999) is now available. Topics include the systems engineering process; system analysis and control; and planning for, organizing, and managing systems. The guide provides a basic, conceptual-level description of systems engineering management as it relates to the development and life cycle management of a system, including basic concepts, problem solving, tools to balance the process, and issues integral to the systems engineering management effort. The text supplements course material at DSMC and is the first guidance issued on the topic of systems engineering since publication of the *Systems Engineering Management Guide* (1990).

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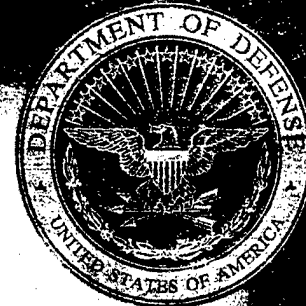FT. BELVOIR, VA 22060-6218

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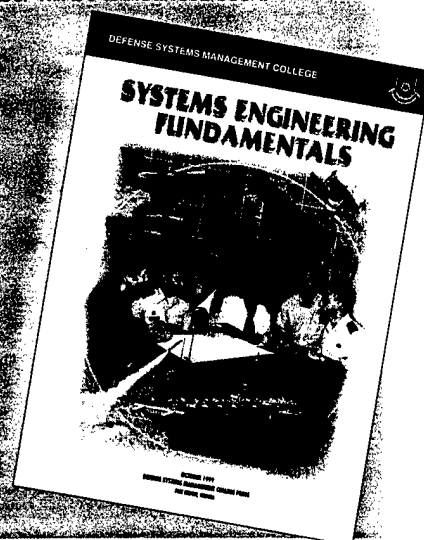
Selected Acquisition Reports

The Department of Defense has released details on major defense acquisition program cost and schedule changes since the December 1998 reporting period. This information is based on the Selected Acquisition Reports (SAR) submitted to the Congress for the June 30, 1999, reporting period.

SARs summarize the latest estimates of cost, schedule, and technical status. These reports are prepared annually in conjunction with the president's budget. Subsequent quarterly exception reports are required only for those programs experiencing unit cost increases of at least 15 percent or schedule delays of at least six months. Quarterly SARs are also submitted for initial reports, final reports, and for programs that are re-baselined at major milestone decisions.

The total program cost estimates provided in the SARs include research and development, procurement, military construction, and acquisition-related operation and maintenance. Total program costs reflect actual costs-to-date as well as anticipated costs for future efforts. All estimates include allowances for anticipated inflation.

The current estimate of program acquisition costs for programs covered by SARs for the prior reporting period (December 1998) was $715,284.6 million. After subtracting the costs for eight final reports and adding the costs for one new program (TACTICAL TOMAHAWK) in December 1998, the adjusted current estimate of program acquisition costs was $706,935.6 million. There was no net cost change during the current reporting period (June 1999). The cost changes between December 1998 and June 1999 are summarized below:

	Current Estimate ($ in Millions)
December 1998 (78 programs)	
Less final reports on completed programs (AFATDS, ASAS, CSSCS, FAAD C2I, MHC 51, TOMAHAWK TBIP, DMSP, and JSIPS	-10,212.4
Plus one new program, TACTICAL TOMAHAWK	+1,863.4
December 1998 Adjusted (71 programs)	**$ 706,935.6**
Excludes classified costs for the Air Force's MILSTAR program.	
Changes Since Last Report	
Economic	$ 0.0
Quantity	0.0
Schedule	0.0
Engineering	0.0
Estimating	-0.3
Other	0.0
Support	+0.3
Net Cost Change	$ 0.0
June 1999 (71 programs)	**$706,935.6**

For the June 1999 reporting period, there was no net cost change reported. The six quarterly exception reports were submitted due to schedule delays of six months or more:

AIM-9X

The SAR was submitted to report a 15-month schedule slip in completing Initial Operational Test and Evaluation (IOT&E) from August 2001 to November 2002, and a 12-month schedule slip to the Milestone III Service Acquisition Executive Review, now scheduled in March 2003. The schedule slips were based on technical difficulties with the Control Actuation System. There were no net cost changes reported as a result of the schedule delay.

IMMEDIATE RELEASE   Aug. 2, 1999

E-2C REPRODUCTION

The SAR was submitted to report a 12-month schedule slip to the Mission Computer Upgrade Milestone III, now scheduled to occur in May 2001. The change was necessitated by software testing delays. There were no net cost changes reported as a result of the schedule delay.

MIDS-LVT (Multi-Functional Information DistriutionSystem - Low Volume Terminal)

The SAR was submitted to report greater than six-month schedule slips in completion of IOT&E for the Low Volume Terminal (LVT) and Initial Operational Capability (IOC). The slips are primarily caused by the lack of available Engineering and Manufacturing Development terminals necessary for the completion of IOT&E. There were no net cost changes reported as a result of the schedule delay.

NESP (Navy EHF [Extremely High Frequency] SATCOM [Satellite Communications] Program)

The SAR was submitted to report a 25-month schedule slip to the Medium Data Rate Operational Test, now scheduled to occur November 2000. The delay was caused by the MILSTAR Flight 3 satellite launch failure on April 30, 1999. There were no net cost changes reported as a result of the schedule delay.
Excludes classified costs for the Air Force's MILSTAR program.

STRATEGIC SEALIFT

The SAR was submitted to report an eight-month slip to Operational Test & Evaluation for New Construction, now scheduled for June 2000, and a nine-month slip to Milestone III, now scheduled for October 2000. These changes were necessitated by the late delivery of USNS Bob Hope and her subsequent operational requirements. There were no net cost changes reported as a result of the schedule delay.

MILSTAR

The SAR was submitted to report schedule delays as a result of the loss of MILSTAR Flight 3. Flight 3 launched on schedule April 30, 1999, but the satellite failed to reach geo-synchronous orbit and was declared a mission failure. As a result of this loss, the MILSTAR Joint Program Office is developing acquisition strategies and associated cost estimates for potential mission replacements. The schedule milestones of MILSTAR II IOT&E Complete, IOC II and Full Operational Capability (FOC) will be delayed by more than six months because of this failure.

New SAR (As of June 30, 1999)

The Department of Defense has submitted an initial SAR for NTW (Navy Theater Wide) missile system. This report does not represent cost growth. The baseline established on this program will be the point from which future changes will be measured. The current cost estimate is provided below:

Program	Current Estimate ($ in Millions)
NTW (Navy Theater Wide missile system)	$4,464.3*

*Pre-Milestone II program reporting development (Research, Development, Test and Evaluation) costs only, in accordance with the provisions of Section 2432, Title 10, United States Code.

Editor's Note: This information is in the public domain at http://www.defenselink.mil/news on the World Wide Web.

Acquisition Warrior 1999

New Games for Acquisition In the New Millennium — Wargaming Meets Best Business Practices

THOMAS W. KOWALCZYK • GEORGIA M. HARRIGAN

Abusiness war game in which 86 representatives from government, academia, allied navies, and industry participated, was sponsored by the Navy's Program Executive Office for DD 21 and hosted by the Navy's Acquisition Center of Excellence (ACE). The ACE merged the processes of wargaming and best business practices with a unique capability — Acquisition Warrior. Acquisition Warrior (AW99), conducted in May, represented a unique forum for "... an open exchange of ideas to increase a body of knowledge."[1]

Understanding, Recognizing, Managing Tomorrow's Acquisition Challenges

AW99 addressed a fundamental issue facing acquisition managers of future defense systems: the lack of a prescribed methodology for ensuring that systems under development address future warfighting requirements (e.g., Network Centric Warfare [NCW]). The intent of AW99 was to identify new approaches to meet emerging warfighting capabilities in the context of NCW. The results are expected to help DoD recognize, understand, and manage tomorrow's acquisition challenges.

AW99 was designed to provide a forum for the exploration of newer, clearer paths through the often complex acquisition process. It also provided insight to the emerging policy, strategy, and operational requirements of complex weapon systems within NCW.

NAVY CAPT. GARY BARRETT (NAVY WARFARE DEVELOPMENT COMMAND) LEADS THE DISCUSSION FOR THE ACQUISITION CELL, USING DISPLAY TECHNOLOGY AVAILABLE AT THE NAVY'S ACQUISITION CENTER OF EXCELLENCE COLLABORATORY.
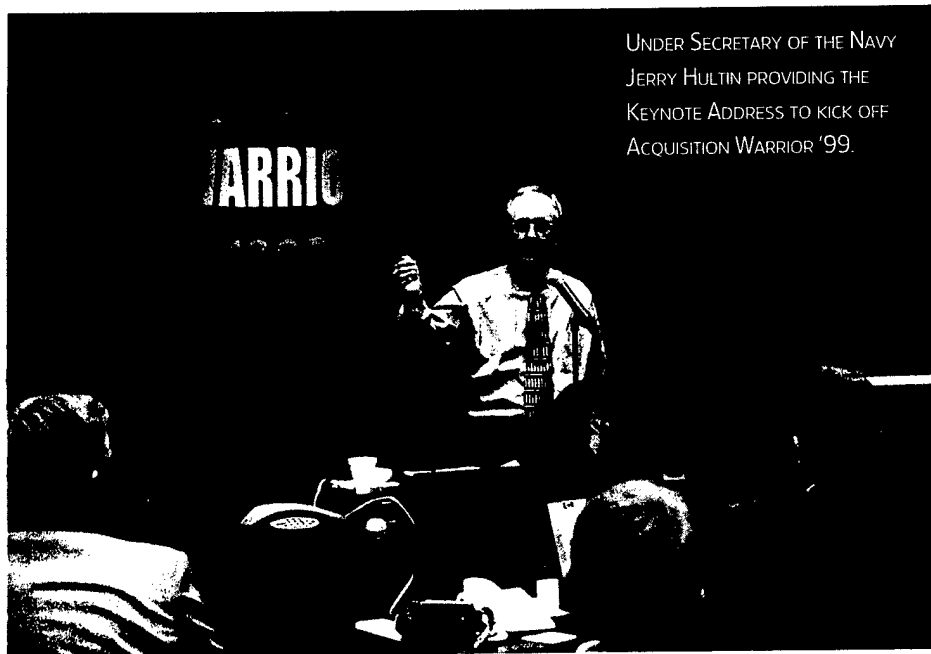
The primary task of the game participants was to examine and identify issues and insights, forging a new understanding of the relationship between NCW capabilities and the acquisition-related processes. The fundamental integrating theme for AW99 — to identify ways to buy [surface combatant] systems that meet existing and future warfighting requirements — relates to the necessary "traction" of the co-evolving fleet operating concepts and the acquisition processes.

The Revolution in Military Affairs engenders a co-evolution of doctrine, organization, and technology. The Revolution in Business Affairs looks to improve linkages with requirements, budget, and acquisition methods. The nexus of the two — where technology meets requirements — was the main focus of AW99. Clearly defined, AW99 provides the linkage or "traction" between the worlds of operation and business (Figure 1). AW99 participants sought to develop a greater understanding of the key issues surrounding the evolving acquisition landscape, particularly regarding DD 21 and the acquisition processes for achieving capability in a network centric environment.

The DD 21 program was used as the case study, or pilot program, for gaming AW99. Navy Rear Adm. Joe Carnevale (PEO DD 21), in an address to participants of AW99, raised the following questions for future consideration:

"How do we fuse the Navy's overarching network centric environment with

Kowalczyk is the Director of Special Programs at the Navy's Acquisition Center of Excellence, where he has pioneered new decision-making processes for the acquisition workforce, including the use of business simulations and war games for complex acquisition decision making. Kowalczyk is also a senior engineer at the Naval Undersea Warfare Center in Newport, R.I. **Harrigan** is also employed by the Naval Undersea Warfare Center, leading strategic initiatives related to organizational transformation at the Navy's Acquisition Center of Excellence. The initiatives include navy business war games.

DoD Photos

ACQUISITION WARRIOR BRINGS DISCIPLINE TO BUSINESS ANALYSIS

Acquisition Warrior Brings the Rigor and Discipline of Operations Analysis to Business Analysis

The military has benefited from the power of war games for more than a hundred years. Navy Adm. Chester W. Nimitz was fond of reporting that he could predict and play out virtually all the World War II battles of the Pacific (with the exception of the use of kamikazes). During the early and mid 1980s, games repeatedly predicted the fall of the Soviet Union.

Since the mid 1980s, wargaming has been successfully adapted for commercial purposes. Forward-looking companies have discovered the "power of practice": trying out market moves in a simulated environment where innovative, bold ideas can be "dry-run" to determine likely outcomes in a dynamic, and therefore, more realistic environment. Through business wargaming, companies have learned to generate better information, analyze that information, make sound choices quickly, and convert strategic choices into decisive action.

The Navy's Acquisition Center of Excellence (ACE) recognizes the value "gaming" has traditionally provided to military forces and more recently to world-class corporations. The ACE, with guidance from Professor Bud Hay, at the Naval War College, developed a series of war games — Acquisition Warrior — the first of which was held in April 1998 and focused on developing the best acquisition strategy for an integrated topside (island) for the CVN 77. As the U.S. Armed Forces change their strategic and operational concepts to meet emerging challenges in the 21st century, there will be significant differences in the way battles are fought. The aim of business wargaming in the acquisition process is to determine how the acquisition of defense systems must also change to support these differences.

industry's fully integrated, distributed processing ship?"

"What are the most important characteristics (qualities) that must be addressed in order to be a highly effective node in a network centric environment?"

Game Objectives and Design

The overall objective of AW99 was to answer these questions by developing strategies to buy systems that will meet existing and future warfighting requirements in view of co-evolving fleet operating concepts and new acquisition processes. Specifically, the goals were to:

- Examine the concepts of a future surface combatant (or any weapon system) as a node in network centric warfare.
- Develop assessment criteria by which to evaluate various aspects of the ship within the broader network.
- Explore new acquisition processes for achieving network centric capabilities to the extent that such processes can help to lead the Revolution in Business Affairs.

AW99 was conducted as an interactive and dynamic process, based on wargaming techniques and reinforced by decision support tools. Participants were grouped into four teams (Warfighting, Logistics, Technology, and Acquisition)

and met in an interactive seminar environment to discuss and resolve issues framed by the formal briefings and the dynamic course of game play. Figure 2 depicts the overall game approach. To accomplish this, the game construct began at a broad view, or macro level, with an understanding of the environment (Move I), then began focusing on the network (Move II), and finally refined the discussion to the weapon system (Move III).

The Game

In his keynote address, Under Secretary of the Navy Jerry Hultin provided a provocative and substantive 45-minute kick-off speech to game participants. He discussed the "heavy" acquisition system, established to defend U.S. interests against the Cold War threat, and challenged participants to strip out the "excess baggage." Not only is the system expensive, but moreover, it "saps innovation and ideas."

According to Hultin, we must apply energy to "solving the problems on how to make the global economy sing and at the same time, taking out a rogue player that's threatening stability." Very familiar with ongoing efforts within the DD 21 program, Hultin also told participants, "The Pentagon is watching. In many ways DD 21 acts as a forcing function for the whole enterprise to rethink how it operates."
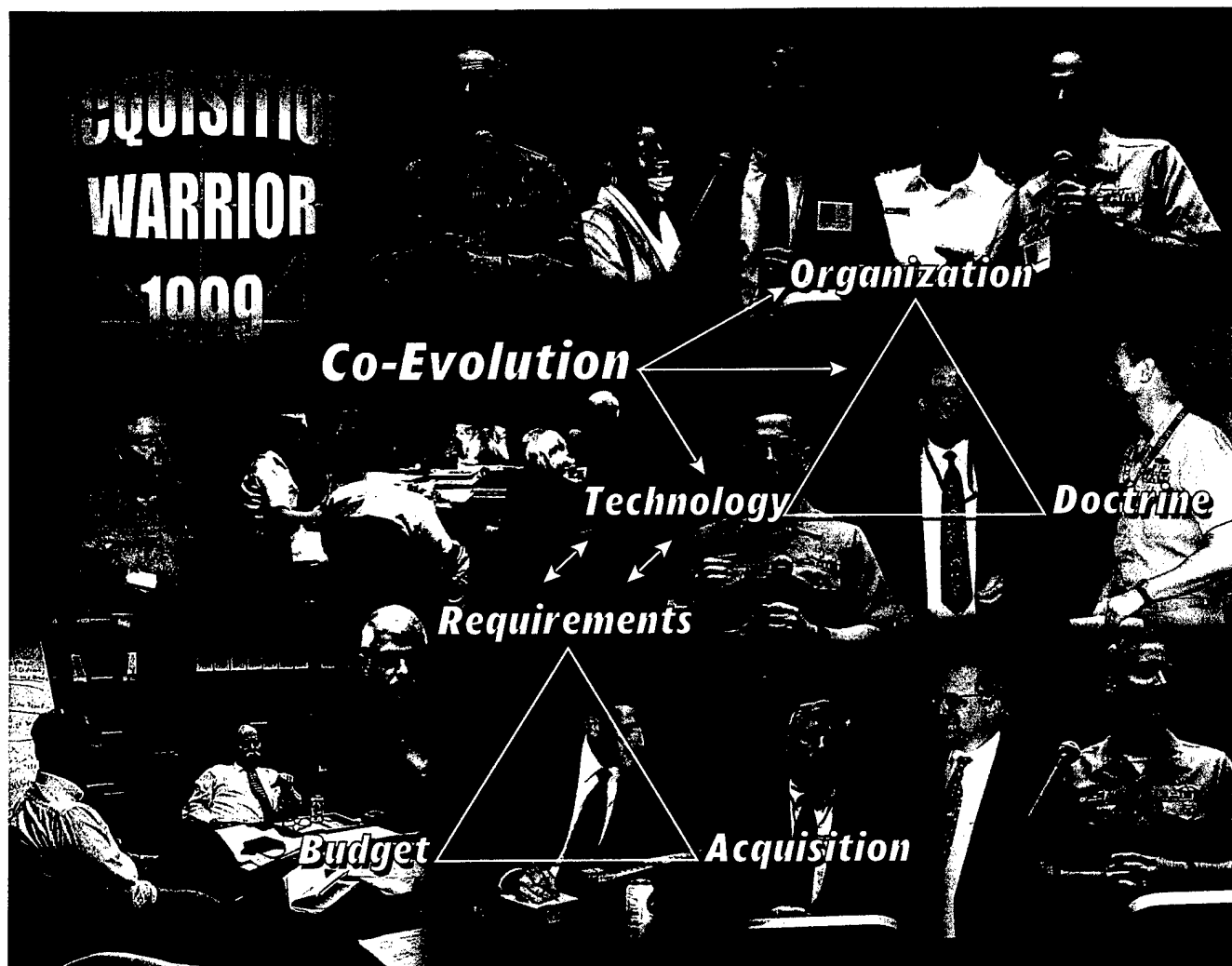
FIGURE 1. **Traction Between Warfighting and Acquisition Communities**

The game continued with a series of briefings and an interactive panel discussion. Figures 3 and 4 present the key points raised during these sessions.

Executive Session

The executive session was held on the last day of the war game and included a round-table discussion in which a representative from each of the teams outbriefed issues, insights, and recommendations noted throughout the game. The objective of this session was to set course for the Senior Executive Panel toward the "road ahead," using an interactive panel discussion format. The executive session began with a summation of all the teams' work that directly addressed Carnevale's questions. A compilation of the teams' completed work produced an extensive list of characteristics, consolidated and aggregated into four main areas:

- Interoperability
- Training/Human-Machine Interface (HMI)
- Quality of Service
- Supportability

Figure 5 summarizes the major characteristics identified.

Following the consolidation of characteristics, a top-level summation of the Key Acquisition Findings was presented to the Executive Panel (Figure 6). The panel concluded that the acquisition process had to become faster if DoD expected to keep pace with newer environments. Eileen Roberson, Acquisition Reform Executive, Office of the Assistant Secretary of the Navy (Research, Development and Acquisition), also noted this requirement for "speed" was not only to keep pace with the technol-

ogy itself, but to recognize that the threat is changing as fast as the technology.

The Warfighting team reviewed issues related to network architecture; system boundaries; interoperability; and concepts and doctrine. It focused on the critical issue of optimizing the flow of information throughout the battlespace, and recognized the information flow had to be up, down, and across the chain of command. The team identified, as a significant tension, the need for a network system architect. It recommended identifying the full scope of responsibilities within the Navy network architecture, in conjunction with joint efforts.

The Logistics team identified the need for a "logistics grid" as an interoperable component of NCW (used with the traditionally identified NCW grids: sensor,
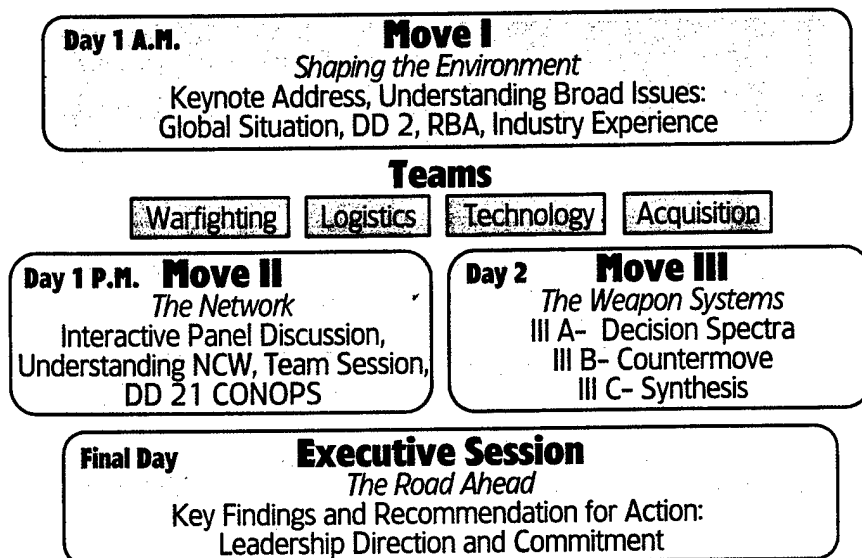
Day 1 A.M.   **Move I**
Shaping the Environment
Keynote Address, Understanding Broad Issues:
Global Situation, DD 2, RBA, Industry Experience

Teams

| Warfighting | Logistics | Technology | Acquisition |

Day 1 P.M. Move II
The Network
Interactive Panel Discussion,
Understanding NCW, Team Session,
DD 21 CONOPS

Day 2 Move III
The Weapon Systems
III A- Decision Spectra
III B- Countermove
III C- Synthesis

Final Day   **Executive Session**
The Road Ahead
Key Findings and Recommendation for Action:
Leadership Direction and Commitment

FIGURE 2. **Acquisition Warrior '99 Game Approach**

- **Challenge**
  - Shift from platform centric to network centric acquisition process
  - Requires new ways of thinking: a revolution
  - DD 21 as the forcing function
- **Context (global geo-strategic environment)**
  - Need to impose order on chaos
    - > Failing states in widespread areas
    - > Periodic, episodic resource interruptions
    - > Increasingly complex situations
  - We are going to have to be "out there"
    - > Timely responsiveness will be key
    - > High op tempo
    - > Emerging training requirements
  - Information and connectivity are key
- **Revolution in Business Affairs**
  - Off-loading responsibilities to shore
  - Understanding and managing risk
  - Integrating infrastructure stovepipes
  - View Navy as a total environment
- **Case Study: Cisco Systems**
  - Must think big in a networking environment
    - > Incremental and marginal changes not enough
  - Information availability and ubiquitous connectivity central to the enterprise
  - Must allow for ample flexibility
- **Knowledge Management**
  - Look beyond the "buzzword" for a structure to collect and disperse knowledge
- **Advanced Naval Fires Concepts**
  - Improved sensing
  - Integrate netted information into knowledge for the warfighter

FIGURE 3. **Summary of Informational Briefings**

information, and engagement), plus several characteristics of the grid, which paralleled NCW. Ideally, the logistics grid improves availability as well as sustainability. The team recommended including a sustainability metric for all levels of the battlespace (e.g., theater, battlegroup, the node [ship], and subsystems).

The Technology team paid particular attention to the overall game objective of developing assessment criteria for a node in NCW. Further, the team identified the need to define metrics for a "good" node. A significant tension is balancing interoperability with interdependence. As one team member commented, "The good news is everybody's connected, the bad news is everybody's connected."

The team concluded technology is not a "limiting" factor for NCW. The challenge is to harness the technology and be able to adapt to it, while ensuring its affordability. With a key goal of defining "real metrics that are validated and demonstrated," the team recommended a two-part approach: (1) Implement a benchmark/evaluation program; and (2) evaluate products and processes in a test bed. The benchmark program goal would be to develop a knowledge base for evaluating competing products. Efforts in this area should include the investigation of industries outside the traditional DoD purview. The test bed goal would be to experiment and create new data. It would be land-based, perhaps a virtual environment, where candidate elements demonstrated their capabilities. Additionally, the test bed should be linked to other ongoing activities within the Navy, including fleet battle experiments and operational war games.

The Acquisition team's effort included a wide range of topics — from acquisition cycle time and incentivizing/involving industry, to re-orienting the process toward functional capabilities, rather than platform capabilities. The team determined the existing acquisition system will not be able to fully support NCW — the system must become faster. First, the "quest for certainty and studying something to death" must end — this mentality accounts for much of

NETWORK CENTRIC WARFARE

The Navy's concept of Network Centric Warfare was introduced in 1997. NCW envisions dramatic improvements in warfighting effectiveness through networking capabilities within a joint task force (JTF). Under this concept, synergies are created in the areas of sensing and detecting; information exchange and coordination among all task force elements; and conduct of maneuvers.

DD 21 will be the first surface combatant designed from the keel up to embody the principles of NCW by exploiting advanced command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) capabilities DD 21 will provide tactical decision-makers with knowledge — rather than simply data or information — of their surrounding battlespace, while sharing that knowledge with others using direct, interactive communication networks.

Operating seamlessly with other U.S. or allied forward-deployed forces, DD 21 will achieve the effects of mass, or concentration of combat power, without having to physically amass forces as in the past. The "sensor-to-shooter" connectivity envisioned for NCW will provide Naval or JTF commanders the range of firepower options needed to match a given target set with the best combination of hard- and soft-kill weapons, thus increasing overall Joint combat effectiveness.

the long acquisition cycle time. A parallel to NCW, called network centric acquisition, was also proposed. The goal of network centric acquisition would be to reduce cycle time. Industry would have to be involved in the effort — not as merely a recipient of the government's change, but as an active participant. To encourage involvement, incentives for industry must be identified and developed.

- **Anticipated future information environment**
  - *Moore's Law:* Computational Power Doubles Every 18 Months
  - *Connectivity:* Communications capacity increasing even faster
  - *Information*
    - > Global coverage, of near real-time proportion
    - > Access to national, commercial, foreign remote sensing
  - *Challenges*

Coordinated Tasking	Ensuring Access
Fusion/Integration	Information Warfare
Information Assurance	Coordinating Surveillance, Strike,
Training	Maneuver
Connectivity and Standards	Compatibility with Legacy Systems

FIGURE 4. **Summary of Network Panel**

A significant tension is the asynchronicity between the hull and its mechanical features (long life cycle) and the electronics/network aspects (short life cycle) of a weapon system. Ideally, there should be different venues to purchase long life cycle items and short life cycles, not a "one size fits all" theory of acquisition. For example, products like hulls, once purchased, last for years; conversely, high-tech electronic equipment can be obsolete in less than 24 months. To use the same process for such diverse equipment spells trouble.

The acquisition process should be "scaleable" and should consider that the shortest possible delivery time is not necessarily the aim; rather, the aim is twofold:

- Achieving optimal delivery time, which minimizes or balances competing risks of incorporating systems with potentially immature (beta-test) components.
- Achieving optimal delivery time, while simultaneously minimizing or balancing the issue of rapid market obsolescence.

Insights from AW99

Major insights were gained in the following categories:

- Concept of business war games as an "open exchange of ideas to increase a body of knowledge"
- Warfighter "traction" back to acquisition community
- Need for a network architecture
- Network centric acquisition
- Value of information
- Evolutionary process of NCW.

An important attribute of Navy business wargaming is it provides a forum for an "open exchange of ideas to increase a body of knowledge." AW99 clearly exhibited this attribute, making the process conducive to tackling very difficult issues. Overall, the level of knowledge of NCW increased dramatically from the Initial Planning Conference (February 1999) to AW99. A similar enterprise-level knowledge growth occurred for the Global War Game: "Some saw Global'98 as a change-driving event in understanding the enormous potential of NCW."[2] Recommendations were made to continue the Acquisition Warrior series. It was also noted the process can, and should, be used to address less encompassing issues specific to program managers, who left the business war game with an updated knowledge of the acquisition strategies used throughout the Department of the Navy (and possibly throughout the Department of Defense).

When Navy Vice Adm. Arthur K. Cebrowski, President of the Naval War College was briefed on AW98 in July 1998, he expanded on the notion of "warfighter traction" to include the need for

traction back into the acquisition community. The fundamental idea for the Acquisition Warrior series had always been to work in a tri-perspective environment – that of Warfighting, Technology, and Acquisition – for the overall benefit of the Navy, but primarily within the acquisition community. The notion of traction led to another perspective of impact – Acquisition Warrior could benefit the entire Navy by providing operators or warfighters this traction back into the acquisition community.

Early on in the AW99 process, the scope was limited to addressing the future interoperability challenge; that is, to have DD 21 enter the fleet seamlessly. The focus of AW99 was to identify the important characteristics of a node operating seamlessly in this future environment. Drawing from an extensive list of characteristics, interoperability continued to be identified as the key characteristic or quality of a node in the context of NCW during the war game. Admittedly, game participants struggled to develop this list as well as clear definitions of each characteristic.

Post-game analysis and research suggest this struggle could be symptomatic of the lack of emphasis on the importance of system architecture in the product development process. Product development experts say to have a product capability (e.g., interoperability), we need an architecture. And product architecture is about getting the right product; system engineering is about getting the product right. No amount of system engineering of complex systems can overcome the absence of an architecture. The product architecture is often captured in a "thud document" (as in the "thud" a document makes when it is dropped). The absence of the network architecture surfaced as a pervasive issue at AW99.

The Warfighting team's recommendation is to designate and fund the Navy network architect to implement the Navy's NCW vision in conjunction with joint efforts. The network architect should also act as the focal point for national and allied network centric architectures. This recommendation is clearly supported by Professor Ed Crawley of the Massachusetts Institute of Technology, who defines the architect's role as including the following responsibilities:

"Define the boundaries and functions, create the concept, allocate the functionality, and define interfaces and abstractions ... the architect is not a generalist but is a specialist in simplifying complexity, resolving ambiguity, and focusing creativity."[3]

Network Centric Acquisition

The characteristics of NCW extend to significant changes required in the acquisition community. If the fleet is to be equipped with systems that allow for NCW, then the community must consider the new business practices in one term, simply, network centric acquisition. The Acquisition team recommended that virtual prototypes be a required item for every system delivered to the Navy. The virtual prototype is necessary, due to the evolutionary development of NCW, and could be used for dynamic assessment of the changing status of the acquisition.

Throughout the game, this notion of moving from "platform centric" acquisition to network centric acquisition was examined. Key enablers for network centric acquisition included:

- Distributed collaborative planning
- Virtual prototypes
- Metrics for system effectiveness that are linked to cost.

Critical for network centric acquisition is that system effectiveness be linked to cost. Not surprisingly, network centric acquisition faces tensions similar to those of NCW because NCW focuses on the information flow among sensors, command-and-control assets, and engagement platforms, instead of focusing on the platforms themselves. This is in contrast to the Navy's structure, with platform-based programs and cost structures. The platforms will not disappear, so it is not a question of "either/or." By linking system effectiveness to cost, system capability can be tracked, thus providing total procurement cost visibility within the collaborative acquisition enterprise. The recommendation from the Acquisition team is to make a change in the budget exhibit to incorporate a tag for capability (allowing aggregation at the system, ship, battlegroup, and joint force level).

Because network centric operations are characterized by information-intensive

- **Interoperability**
  - Interacts with legacy nodes
  - Architecture common with national (joint) combat and combat support systems
  - Provides critical info to all participants (collects/processes/distributes)

- **Supportability**
  - Easily upgradeable/affordable
  - Supportability tied to mission
  - Minimizes O&S costs
  - Environmentally friendly
  - Can be communicated/distributed across entire acquisition community

- **Quality of Service**
  - Reliable/dependable
  - Able to fight/hurt
  - Prioritization
  - Acts as push/pull node
  - Timely
  - Graceful Degradation
  - Secure at all levels

- **Training/HMI**
  - Minimal training
  - Accommodates cognitive differences
  - Provides self-service HMI

FIGURE 5. **Characteristics of a Highly Effective Node in a Network Centric Environment**

interactions among computational nodes on the network, the "value" is derived from the content, quality, and timeliness of information moving between these nodes. The Logistics team suggested that sustainability consider not only material, but also tactical and nontactical information and personnel: "For a netted system, overall readiness needs to include all the mission participants."

The team also emphasized the inclusion in logistics of measuring and managing availability (Ao) of information systems. Each level (e.g., theater, battlegroup, ship, subsystem) of the system should have a sustainability metric and define Ao in relation to operational performance and availability of the network, blurring the lines between operators and logisticians. But both the Logistics and the Technology teams recognized that information is not the only factor in the value of information: Personnel, or "the human," [4] is the governing factor in NCW. The Technology team pointed out software technology in development today is leading to accounting for cognitive differences: "Eventually, the machine will know the users who are sitting in front of it and will be able to talk to them or display the data in the way each person can best understand it." When this day comes, the necessity to have metrics for valuing information in place will only intensify.

Cebrowski's key challenge is the co-evolution of technology, operational doctrine, and organization:

"Successfully transitioning from platform centric to network centric warfare will involve more than just the introduction of new technology. It requires the co-evolution of that technology with operational concepts, doctrine, and organization. A network centric force operates under a different rule set than a platform centric force. We will have to change how we train, how we organize, and how we allocate our resources."

More Than Just Bridging the Gap
It is not enough to bridge the gap between technology and need. The Navy will increasingly assimilate information

technology and find it necessary to adapt or co-evolve organizations and doctrine as it does so. Much of the change is simply the evolving nature of the NCW concept. This evolution is not going to stop in the foreseeable future. A strategy to deal with this issue evolved: (1) Document and publish findings from AW99 to continue the debate; and (2) establish a test bed for continuous evaluation.

Acquisition Warrior could have been called Acquisition Advocate. The necessity to discuss the difficult and sometimes contentious issues promotes understanding, learning, and discovery. Attacking these tension points is critical.

NCW is, and will continue to be, a complex concept. It is an enabler for warfare; it is a process, not a specific product. "Warfare" is the noun that invokes the complexity theory, which suggests that discussion in the area will never be clear-cut or straightforward.

"Complex systems have somehow acquired the ability to bring order and chaos into a special kind of balance. This balance point — often called the edge of chaos — is where the components of a system never quite lock into place, and yet never quite dissolve into turbulence, either."[5]

The answers to Carnevale's questions are an evolving process to which AW99 provided only the opening response to

what will surely remain an ongoing dialogue.

Editor's Note: Navy Rear Adm. Joseph A. Carnevale, who is currently the Program Executive Officer for DD 21, the 21st century destroyer and its associated programs, looks forward to continuing this dialogue. Contact him at (703) 602-0616 or by E-mail at **CarnevaleJA@ NAVSEA.NAVY.MIL.** The authors also welcome comments or questions concerning this article. Contact Kowalczyk at (401) 832-1836 or by **E-mail at kowalczyktw@npt.nuwc.navy.mil.** Harrigan can be reached at (401) 832-1835 or by E-mail at **harrigangm@npt.nuwc. navy.mil.**

ENDNOTES

1. Comment by Navy Rear Adm. Joseph Carnevale during the AW99 post-game meeting regarding the value of conducting business war games, May 6, 1999.
2. Game Report — Global 98 War Game, conducted at the Naval War College, July 13-31, 1999.
3. Crawley, Edward F., Massachusetts Institute of Technology, Aeronautics & Astronautics Department Head. Presentation entitled, "System Architecture," Feb. 11, 1999.
4. Zimm, Alan D., "Human-Centric Warfare," U.S. Naval Institute Proceedings, May, 1999.
5. Waldrop, Mitchell M., *Complexity*, Touchstone Books, September, 1993.

- Not a single program-specific issue
- No technology impediments
- Establish a Chief Information Technology Officer or Lead System Integrator
- Must be adaptable to *Moore's Law* (18-month double capacity)
- Trades between maintain or replace
- Must trade off minimum onboard maintenance versus more "techies" on board
- Modularity
- Acquisition cycle time reduction
- Get more parties involved

FIGURE 6. **Key Acquisition Findings**

Defense Automated Printing Service Receives White House Award

Defense Logistics Agency's Defense Automated Printing Service [DLA DAPS] was presented a White House Closing the Circle Award during ceremonies at the Old Executive Office Building next to the White House July 13, 1999. Lt. Gen. Henry T. Glisson, DLA director, received the award.

"DLA is innovative and active in environmental and conservation efforts. The DAPS team showed its continued commitment toward protecting the environment by winning this award," said Glisson.

The Office of the Federal Environmental Executive presents awards to recognize individuals and groups who demonstrated leadership in implementing pollution prevention provisions of Executive Order 13101, Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition.

DAPS provides Department of Defense agencies with digital output, imaging, document conversion, scanning, CD-ROM, printing, copying, and World Wide Web services.

"I want to take this opportunity to express my appreciation for your efforts toward 'Greening the Government.' You have accepted the challenge to ensure that, as we move together into the 21st century, the Federal Government will continue to lead by example," said Vice President Al Gore in a letter to the 1999 award winners.

The team award in the Affirmative Action category was presented based on the results of "before" and "after" DAPS surveys conducted between the period of October 1997 and November 1998 of all paper purchased for its cost-per-copy and in-house operations. The initial survey revealed that 63 percent of 1.25 billion sheets purchased contained 100 percent virgin fiber. With these results, DAPS directed all operations to use only 20 percent or greater post-consumer recycled paper by Oct. 1, 1998, to be in full compliance with the Executive Order. Orders for virgin paper ceased effective June 15, 1998.

Waivers to use 100-percent virgin fiber paper had to meet the guidelines outlined in the Executive Order and be approved by the DAPS Chief Operating Officer.

The follow-up study conducted October-November 1998 showed a dramatic improvement in the procurement of recycled paper purchases as a percentage of total monthly paper purchased, increasing from 37 percent as of May 31, 1998, to 97 percent as of Nov. 30, 1998.

DLA was also mentioned on a team award presented to the Navy for the Joint Service Pollution Prevention Technical Library. The library is the comprehensive DoD environmental resource containing information on equipment, technologies, and management practices that assist installations in reducing or eliminating waste generation. The library is a cooperative effort [of] the Navy, Army, Air Force, Marine Corps, Coast Guard, and the DLA. The library may be accessed at **http://enviro.nfesc.navy.mil/p2library**.

Editor's Note: This information is in the public domain at **http://www.dla.mil/public_info/DAPS close.htm** on the World Wide Web. For more information, call Gerda C. Parr, (703) 767-6182.

ONR Developing Technology Insertion Curriculum for New S&T Component of DoD's Acquisition Workforce

DR. WILLIAM E. LUKENS

The science and technology (S&T) component of DoD's acquisition workforce now has a new course targeted to its educational needs. Dr. Fred E. Saalfeld, Office of Naval Research (ONR), gave the opening lecture for "Technology Insertion in Systems Acquisition," (a new course that is expected to meet requirements for newly identified science and technology personnel as assignment-specific training, and should also be available to meet continuous learning requirements). Seventeen senior personnel (one from DARPA, 16 from ONR) attended the initial session, held at the Defense Advanced Research Projects Agency (DARPA), Arlington, Va., June 29 through July 1.

The course presented an overview of the evolving role and required skills necessary for science and technology program managers to impact DoD's acquisition programs. Classroom discussions revolved around the DAWIA, how Department of the Navy (DoN) science and technology plays in the acquisition process, fundamentals of systems acquisition management, integrated product and process development, legal and ethical issues concerning industry interface, and integrated product teams.

Navy Rear Adm. John F. Shipway, Direct Reporting Program Manager for Strategic Systems Programs, related some of the common concerns from the acquisition perspective and challenged students to improve on transition of science and technology products to acquisition. At course conclusion, a panel of Acquisition Program Managers and Science and Technology Program Officers provided their success stories and lessons learned concerning transition of science and technology products to acquisition.

In designing the "Technology Insertion in Systems Acquisition" curriculum, the Office of Naval Research, led by Navy Rear Adm. Paul G. Gaffney II, Chief of Naval Research, consulted with, and coordinated its efforts through, several Navy and defense acquisition career management executives: retired Navy Rear Adm. Leonard Vincent, former Commandant, Defense Systems Management College (DSMC); retired Rear Adm. William Hauenstein, DoN Director of Acquisition Career Management; Paul Schneider, Principal Deputy to the Assistant Secretary of the Navy for Research, Development, and Acquisition; and Dr. James McMichael, DoD Director of Acquisition Education, Training, and Career Development.

To ensure the most productive use of the three days students devoted to the course, ONR defined and made available prerequisite courses that involved distance learning:

- **Fundamentals of Systems Acquisition Course (ACQ-101).** A DSMC course offering, ONR posted ACQ-101 to the ONR Intranet, making it readily available for review by students prior to attending the course. DSMC professor Jim Sheldon facilitated the course session on systems acquisition management.
- **Integrated Product Team (IPT) Course.** Issued by the DoN Acquisition Reform Office and facilitated by DSMC professor, Navy Cmdr. John Kelley, ONR, posted the IPT Course to the ONR Intranet in addition to one other prerequisite on Integrated Product and Process Development.

Eventually, Gaffney plans to cycle all ONR science and technology managers through the course, which will be offered every two months.

Editor's Note: The author encourages questions or comments concerning this article. Contact him by E-mail at lukensw@onr.navy.mil.

DR. FRED E. SAALFELD, EXECUTIVE DIRECTOR AND TECHNICAL DIRECTOR, ONR, IS PICTURED GIVING AN OPENING LECTURE FOR THE "TECHNOLOGY INSERTION IN SYSTEMS ACQUISITION" COURSE, HELD AT THE DEFENSE ADVANCED RESEARCH PROJECTS AGENCY (DARPA), ARLINGTON, VA., JUNE 29 THROUGH JULY 1. SEVENTEEN SENIOR PERSONNEL (ONE FROM DARPA, 16 FROM ONR) ATTENDED THE INITIAL COURSE OFFERING.

Lukens is an employee of the Office of Naval Research and Visiting Professor, DSMC. As program manager for the "Technology Insertion in Systems Acquisition course," he is currently coordinating with the other Services to assist in developing a DoD-wide course addressing the educational requirements for all science and technology personnel in the defense acquisition workforce.

Photo by Richard Mattox
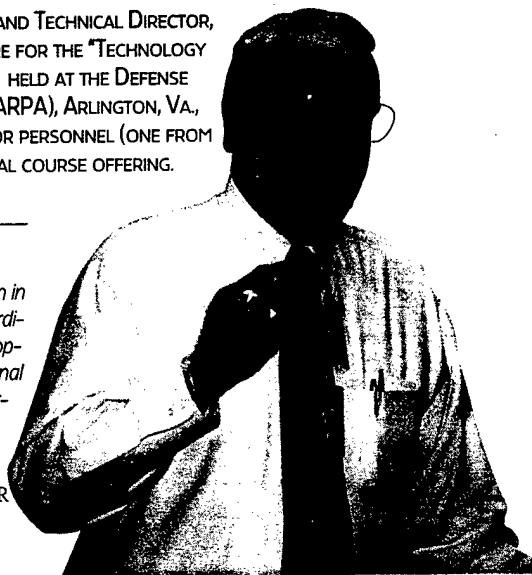
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THE DEFENSE SYSTEMS MANAGEMENT COLLEGE
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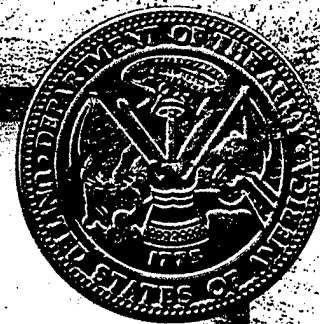
USC to Put 'Virtual Reality' Into Army Training

PAUL BOYCE

WASHINGTON — Secretary of the Army Louis Caldera signed a $45 million contract last week with the University of Southern California, establishing an institute to develop state-of-the-art modeling and simulation technologies.

The Army wants to leverage advances in modeling and simulation technologies to improve the realism and quality of its training simulations, officials said. The Army also wants to use this same technology to improve leader-development exercises. Officials said they want to apply the modeling to test prototypes in future weapons acquisition programs.

The contract with USC was signed Aug. 18, during a ceremony in Los Angeles announcing birth of the "Institute for Creative Technologies (ICT)."

"We found a high-tech solution with this USC partnership to deliver those improvements in education and military training for the next century," Caldera said. "The USC Institute for Creative Technologies will be a joint effort of the Army, the entertainment industry and academia — an innovative team to advance dazzling new media and ultimately benefit training and education for everyone in America. This research has high-value applications to the Army, as well as the entertainment, multimedia, video game, destination theme park, and information-technology industries."

Caldera said the new technologies would help the Army make a "quantum leap forward" in preparing soldiers for diverse missions in the world of tomorrow. "This will revolutionize the way the Army trains its soldiers and how it rehearses for missions," he said. "It will enhance the realism and, thus, the value of the individual, crew-served, and networked training simulators that we use to train our soldiers. It will permit our soldiers to do en-route mission rehearsals immersed in high-fidelity images of the actual terrain to which they are about to deploy, with very real story and character content to prepare them to accomplish the mission."

Steven B. Sample, president of USC, said the ICT will develop the technologies for synthetic experiences so compelling that people will react as though they were real — a virtual reality of sensations and sights.

"The key word is 'verisimilitude' — the quality or state of appearing to be true," he explained. "Verisimilitude will apply to simulation technology in the same way that the term 'high fidelity' has applied to audio."

Also attending the Los Angeles announcement were Lon S. Hatamiya, secretary of the California Trade and Commerce Agency; City of Los Angeles Deputy Mayor Rockard Delgadillo; Jack Valenti, chief executive officer of the Motion Picture Association of America; and Richard E. Belluzzo, chairman and chief executive officer of SGI, formerly Silicon Graphics, Inc. California Governor Gray Davis spoke at the event by satellite broadcast from Sacramento.

"As a Vietnam veteran myself, I know that when it comes to accomplishing the mis-

sion, two things matter: the quality of a soldier's training, and the quality of his or her weapons. The new virtual technologies established by this project will prepare America's soldiers for the diverse and unique military operations of the future."

Researchers from the USC School of Cinema-Television, the USC School of Engineering, and USC's Annenberg School for Communication will collaborate with creative talents from the entertainment industry in the interdisciplinary research program. They will work to combine concepts of story and character, with a rapidly increasing degree of immersion in virtual reality technologies.

The Army will employ these improved simulation technologies to rehearse for missions; strategic planning through interactive battle scenarios; and combat training, recruitment, and equipment acquisition, officials said.

The institute will pursue a combination of basic and applied research. Basic research will cover six areas: simulated "immersion" by users in the technological experience; networking and databases; story; characters; setup; and direction. Applied research will be organized around a small number of long-term themes, such as simulating futuristic "Army After Next" forces.

While the Army and the entertainment industry share an interest in advancing simulation capabilities for specific purposes, these technologies offer clear potential to dramatically change training and education for all people, officials said.

"In these advanced synthetic environments that we will create, participants will be fully immersed – physically, intellectually and emotionally – in engrossing stories stocked with engaging characters who may either be simulated or manned," said Cornelius Sullivan, USC vice provost for research, who will oversee the program.

The ICT contract will be administered by the Army's Simulation, Training, and Instrumentation Command, known as STRICOM, headquartered in Orlando, Fla., and commanded by Army Brig. Gen. William Bond. The Army and USC will each appoint people to executive boards that will jointly control the ICT.

Editor's Note: This information is in the public domain at **http://www.dtic.mil/armylink/news** on the Internet.

Foreign Comparative Testing Program

Twenty Years of Success at Aberdeen Proving Ground

TOM BUONAUGURIO

What Army program ended a century of dependence on gasoline, introduced three tactical vehicles to the Army, and led to the Type Classification of modern chemical agent detectors across the Services? The answer, revealed in the title of this article, was not a program conceived and directed from the halls of the Pentagon but near the picturesque headwaters of the Chesapeake Bay. For purposes of this article, how fitting that the first shot, signaling the start of Aberdeen Proving Ground's test and evaluation mission, came from a French 75 mm howitzer that is still located at the entrance to this premier Army installation, internationally recognized for research and development, test and evaluation, and soldier training. Although it was fielded by the Army in World War I, long before the phrases Off the Shelf, Non-Developmental Item and Foreign Comparative Testing (FCT) were in vogue, it was a precursor of today's program.

SCOTT MILLER, ARMY RESEARCH LABORATORY, BRIEFS ARMY LT. GEN. MICHAEL S. DAVISON, JR., DIRECTOR, DEFENSE SECURITY COOPERATION AGENCY, ON THE SNIPER DETECTION SYSTEM.

This article promotes the successful Army FCT program, highlights the achievements of the Army FCT management team, and illustrates some of the more remarkable allied systems introduced into the Army's weapon systems inventory. Together, they not only serve today's Army warfighter, but also represent a significant contribution to the next-generation, 21st century Army warfighter, helping to fill key niches in defense material that may otherwise have been delayed or unfilled.

Aberdeen Proving Ground, Home of Army FCT

Where is Aberdeen Proving Ground, and why is this the home of Army FCT? Located less than two hours north of Washington, D.C., the installation was founded on the eve of U.S. entry into World War I. Sixty years would pass before Congress formally established the FCT program in 1977. The Army established its FCT team within Headquarters, Test and Evaluation Command because personnel were closely associated with research,

development, and test and evaluation (RDT&E) operations and had a wide range of defense commodity experience.

The majority of the systems evaluated in the past 20 years have historically been European with the United Kingdom (UK), French, and German systems accounting for about half the programs.

Interestingly, these nations are well represented in local history at Aberdeen. The French General La Fayette traveled extensively in the area during the Revolutionary War, and many Germans settled in the area. In 1814, British Navy Rear Adm. Sir George Cockburn sailed the shores of Aberdeen, landing troops

Buonaugurio is a project officer within the International Materiel Evaluation Office at Aberdeen Proving Ground, Md. He earned his B.S. in Engineering at the University of Maryland, an M.B.A. from Florida Institute of Technology, and continues to pursue his graduate studies at the University of Maryland. He is a graduate of the APMC Technology Transfer and Advanced International Program Management Courses, DSMC.

Nuclear, Biological, and Chemical Reconnaissance System (NBCRS) Reconnaissance System "Fox" (XM93E1) from Germany, one of the three most unique tactical vehicles in DoD service, began its evaluation through the FCT program.
Photo courtesy General Dynamics

ated by the Army, via the FCT Program. This continues in the vein of the proud achievements of a legendary Chemical Corps commander, Army Gen. Anthony Macauliff of "Bastogne Nuts" fame, who commanded the Edgewood area of the Proving Ground shortly following the end of World War II.

Three of the most unique tactical vehicles in DoD service began their Army service evaluation through the FCT program:

- Small Unit Support Vehicle from Sweden
- Fox Nuclear, Biological, Chemical Reconnaissance Vehicle from Germany
- Interim Vehicle Mounted Mine Detector, also known as the Chubby (the first ever procurement from the Republic of South Africa).

The Army charged into the 20th century astride the horse, but relied on gasoline as it moved toward a gas-guzzling, horse-powered mechanized force. On the brink of another new century, the Army is moving into the 21st century with the Modern Fuel Burner and 2 kW Generator Set – both from Canada – which may mark the end of gasoline use. The soldier no longer must transport 5-gallon fuel cans of volatile and inherently unsafe fuel in the field, but can instead use standard motor vehicle JP-8 diesel.

When the Army entered World War I in 1917 as part of the American Expeditionary Force, towed artillery was manufactured principally in the UK and

in the vicinity after failing to take Baltimore. After 200 years the locals still differ over the French pronunciations and embrace the British, who didn't cause a serious casualty, but left the state of Maryland with historic landmarks for the tourist industry.

Successes

What specifically has the FCT program done for the Army over the past 20 years? Most of the modern chemical agent detector projects successfully adopted by the Army, the other military services, and select government agencies were evalu-

France. Fast forward more than 80 years, and our towed 105 mm howitzer is an FCT product of the UK. To accurately deliver these munitions, plus our home-grown 155 mm rounds on target, the Army has fielded another FCT project called the Gun Laying and Positioning System. This product of Switzerland is a vast improvement over earlier systems and gives U.S. warfighters the edge they need when using the queen of the battlefield.

The report card of Army FCT speaks for itself. With the first Service FCT team, the Army has generated the most proposals, the most successes, and procured the most allied equipment! In 20 years, 550 proposals were received, with 151 funded and ultimately 43 bought and fielded.

The Process
The nomination and submission process of the FCT program is straightforward. A proposal is written and submitted by a Program Manager or Research and Development Center to the Army FCT team. The FCT Web site offers the template, examples, points of contact, and key background information invaluable to the sponsor.

The cornerstones of obtaining approval on an FCT proposal are also no secret. A written requirement document, preferably an Operational Requirements Document, is provided along with the results of the market survey. The allied equipment nominated for evaluation must be non-developmental and preferably fielded. The acquisition strategy identifying procurement funds and the fielding plan, assuming successful evaluation, is key. The proposals that receive high priority for funding must cite a cost savings, schedule advantage, or better performance over existing systems. The FCT program does not consider proposals that are primarily for expanding a database, conducting a threat assessment, or technology exploitation.

The format of the proposal is based on a non-developmental acquisition strategy. The FCT project chart depicting the proposed schedule with budget estimate
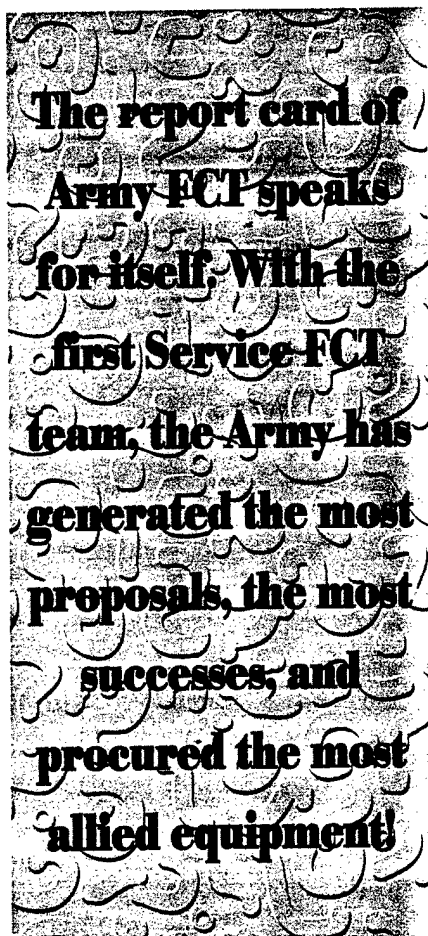
is a Gantt chart. Gantt charts, as used in the FCT program, are horizontal bar graphs depicting planned milestones and costs. Coincidentally, Henry Gantt was stationed at Aberdeen right after its establishment in 1917 and developed his [then] novel chart to track the interconnected tasks and milestones of his projects.

The Present
Where is the Army FCT program now? During a January 1999 review, Army Lt. Gen. Michael Davison, Jr., Director, Defense Cooperation Security Agency, saw firsthand the successes and current projects at Aberdeen Proving Ground. The Army is moving aggressively with FCT evaluations across the whole spectrum of commodity areas. Ammunition from Norway, Germany, and Israel; an Acoustic Gunfire Detection System from France; Insensitive Missile Motors from the UK; and much, much, more.

How to use the FCT program is no secret. Sponsors have structured their pro-

posals to evaluate complete systems, major sub-components, and even spare parts. The yearly cycle begins in December with up to 35 proposals eventually received and evaluated. The staff receives approval for 10-12 new starts and continuing projects annually. Funds are released at the start of the new fiscal year. Typical project funding is $960,000 with an initiation to adoption decision averaging 21 months.

The Future
The Army FCT team of four personnel is half the size it was in 1992. Through aggressive and dedicated team skills and innovation, the team maintains the same level of competitiveness with the other Services for funding However, September 1999 marks a transition period, as the Aberdeen executive office for FCT closes despite written concerns at all levels.

The Office of the Under Secretary of Defense plans to work with the Army in establishing a new team and process with an eye toward remaining successful and achieving the same standards.

One new noteworthy process, based on a successful demonstration during the FY99-00 cycle, will be a "paperless" Lotus Notes-based application for creating and staffing the proposals. This will significantly enhance the proposal process since all integrated process team members will have access via the Internet. Additionally the Services will benefit since the ease of reviewing the proposals will reduce redundant proposals and possibly lead to more joint programs that are based on similar requirements.

Editor's Note: Visit the FCT Web site at **http://www.acq.osd.mil/sts/fct/** to find out more about the FCT program. Also posted are program requirements; procedures on using the new online, Web-based proposal process; and the latest congressional reports, summarizing FCT success stories and projects currently in progress.The author welcomes questions or comments on this article. Contact him at **amxipoi@ tecom.army.mil.**

Civilian Personnel Downsizing Painful, Successful

PAUL STONE

WASHINGTON (AFPN) – It's been a long 10 years, and Diane Disney will not hesitate to say it's been painful at times. But she will also tell you the Defense Department's downsizing of its civilian workforce has been successful and achieved with a transition program that's better than any other in government and better than almost any in the private sector.

Disney is Department of Defense's Deputy Assistant Secretary of Defense (DoD DASD) for Civilian Personnel Policy. She has been a key player in the programs and policies that have taken the civilian work force from a September 1989 figure of approximately 1.1 million personnel to its current 700,000 – and done so "humanely as well as efficiently," she emphasized.

She's particularly proud of the fact that of the 400,000 jobs eliminated or transferred to private contractors, only about 9 percent resulted in actual layoffs.

"That is a record I don't think any private sector business could meet," she said.

Three programs proved particularly successful in drawing down the civilian workforce without having to resort to layoffs, Disney said. The Priority Placement Program helped place about 70,000 workers in other positions in and outside DoD. The permanent program is routinely used to place workers in other federal jobs when installations or agencies close or downsize.

The other programs, Disney noted, are the Voluntary Early Retirement Act (VERA) and the Voluntary Separation Incentive Pay (VSIP) Programs. Under VERA, employees can retire early and begin collecting benefits. VSIP pays employees to leave federal civil service – up to $25,000, depending on length of service and other factors. Some employees were able to take advantage of both programs. She said about 126,000 DoD civilians have opted for VSIP since 1989 and 56,000 have retired under VERA.

Disney said DoD has received authority to continue the VSIP program through 2001 and is proposing an extension through 2003, with the authority already existing to continue the VERA program. Both will be important during the next several years because, she said, DoD must eliminate about 100,000 more civilian positions between now and 2003.

In addition to these popular and effective programs, Disney said DoD has experimented with other incentives. For example, anyone who leaves federal service may elect to continue federal health care coverage for up to 18 months if they pay the premiums.

"We went a little further in Defense and got the authority to continue making the payments for them to help ease the transition period," she said. The benefit made a profound difference to some people, she added.

One program that has not worked well is the Non-Federal Hiring Incentive Program. The program offers private-sector businesses up to $10,000 for each DoD civilian they retrain or relocate, as long as the employee is retained for at least one fiscal year.

While understanding how difficult downsizing has been, Disney is also proud of the way the military departments and agencies have handled the process.

"Unlike other kinds of organizations, DoD must always be ready for its mission," Disney said. "And that doesn't mean it can be in a full state of readiness in Germany but not in Korea. We have to be ready at all sites at all times. We've tried to manage the downsizing humanely and efficiently, but we couldn't have managed it at all if the people who work for DoD had not remained consistently dedicated to the mission."

Editor's Note: This information, orginally published by American Forces Information Service, is in the public domain at **http://www.af.mil/news** on the World Wide Web.

New Software Helps Commanders Track VISA Cards

WASHINGTON (AFPN) — In much the same way the speed of electronic checking eliminated the practice of writing a "hot" check, the Electronic Account Government Ledger System, known as EAGLS, is predicted to stop the practice of using the government travel card for seemingly innocent, yet unofficial purchases.

Initiated by NationsBank for the government travel card program, EAGLS is an online, real-time Internet-capable, point-and-click software program that can provide commanders immediate access to individual accounts. It also allows them to track transactions on an almost daily basis.

This is light-years ahead of the former paper-based system that provided a monthly printout of each cardholder's activities, according to Michael Weber, program manager for the Air Force travel card program.

"EAGLS can provide information on transactions less than 24 hours after a card is used," he said.

According to Weber, eliminating abuse through better tracking is just one of the many ways EAGLS is going to help commanders, agency program coordinators and cardholders better manage the government travel card program. The ability to perform immediate, online maintenance is another.

"For example," he said, "if a card holder's ATM limit needs to be raised or lowered, the change will be effective overnight after the agency program coordinator types in the information." In much the same way, the commander can also limit spending by card abusers and turn cards off and on electronically.

While EAGLS is currently only available to commanders and their agency program coordinators, Weber said it ultimately would be available to every cardholder.

This will give cardholders the convenience of accessing NationsBank newsletters, checking their balance, and even printing out a copy of the monthly statement before it arrives in the mail.

Editor's Note: This information, orginally published by American Forces Information Service, is in the public domain at **http://www.af.mil/news** on the World Wide Web.

WHAT: DTIC '99 ANNUAL USERS MEETING & TRAINING CONFERENCE

WHEN: Nov. 8-10, 1999

WHERE: DoubleTree Hotel National Airport
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Arlington, Va.

INFO: http://www.dtic.mil/dtic/annualconf/
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JAWS S³ — Making Information Work for the Warfighter

Annual Symposium Gaining Momentum, Promoting Joint Operations Cooperation, Communication, Decision Making

COLLIE J. JOHNSON

From technology development to Advanced Concept Technology Demonstrations; from systems acquisition to Modeling and Simulation (M&S) for training and exercises — government and industry are preaching and practicing acquisition reform, and promoting best practices and processes to field affordable, reliable, maintainable, technologically superior weapon and support systems.

Truly achieving DoD's *Joint Vision 2010's* objectives of information superiority and full-spectrum dominance are dependent on one common element: *Information.* Information technology is increasingly critical in maximizing warfighter effectiveness. In fact, *Joint Vision 2010* is built on the premise that modern and emerging technologies, particularly information-specific advances, should make possible a new level of joint operations capability.

Easy to Say, But Will They Buy It?

Probably the hardest part of achieving *Joint Vision 2010's* objectives of information superiority and full-spectrum dominance, however, will be attaining the buy-in, interaction, synergy, and partnership of all the DoD acquisition workforce and defense industry communi-

Johnson is managing editor, Program Manager magazine, Division of College Administration and Services, DSMC.
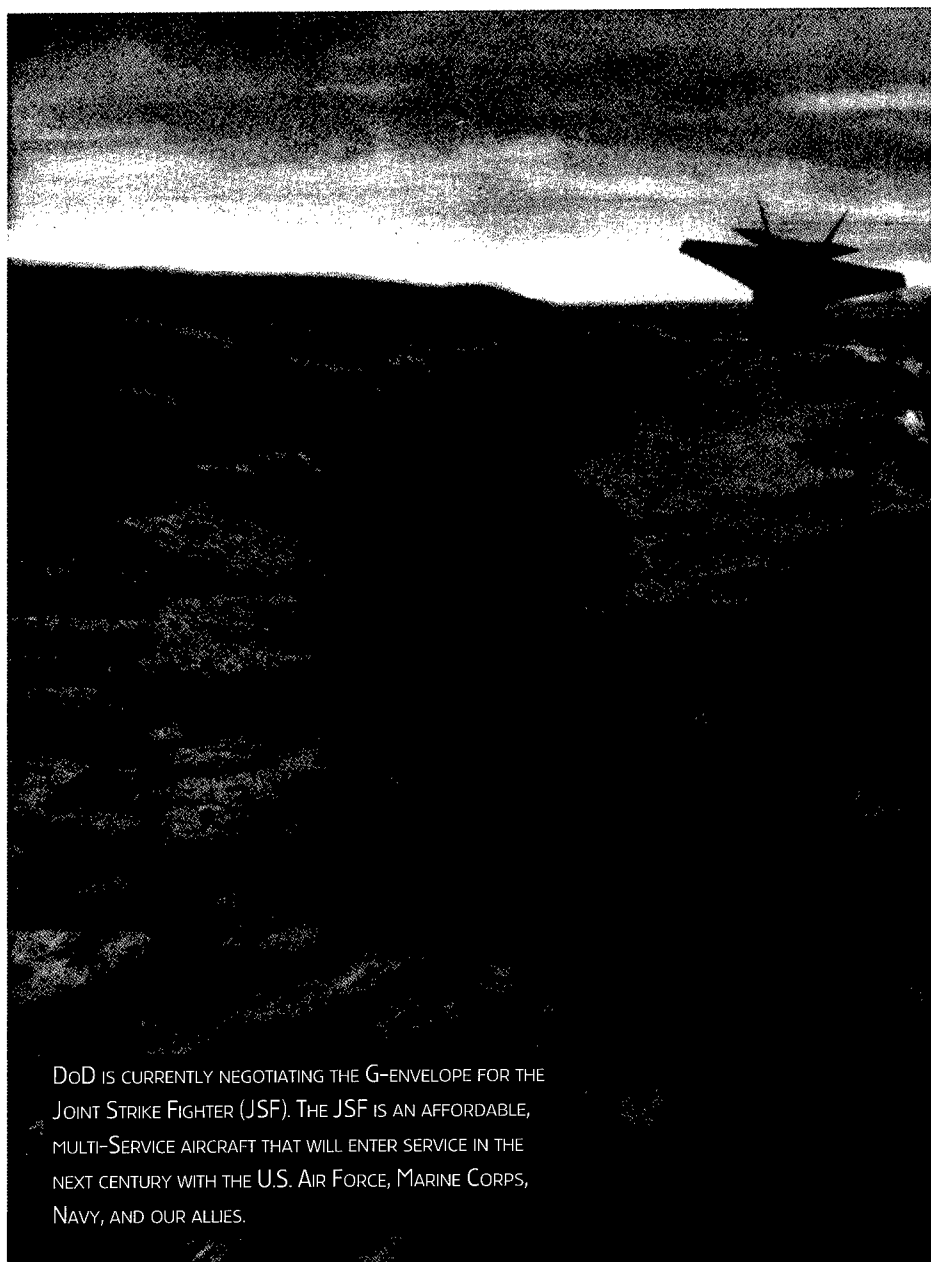
DoD IS CURRENTLY NEGOTIATING THE G-ENVELOPE FOR THE JOINT STRIKE FIGHTER (JSF). THE JSF IS AN AFFORDABLE, MULTI-SERVICE AIRCRAFT THAT WILL ENTER SERVICE IN THE NEXT CENTURY WITH THE U.S. AIR FORCE, MARINE CORPS, NAVY, AND OUR ALLIES.

ties of practice, such as test and evaluation, operations, aerospace systems, acquisition development, obscurants/sensors, and many more.

The Joint Aerospace Weapon Systems Support Sensors and Simulation Symposium (JAWS S³), a forum conceived 10 years ago for just that purpose, is making inroads and gaining momentum each year as it brings DoD's diverse communities of practice together to talk, listen, think about things in different ways, share solutions, present lessons learned, network with other professionals, and explore new technologies.

"Making Information Work for the Warfighter," was the timely and relevant theme selected for the 1999 JAWS S³, held in San Diego, Calif., June 13-18. A diverse sponsorship included all the military services as well as the following DoD Components/Agencies:

- Deputy Director, Operational Test & Evaluation/Live Fire Testing, Office of the Secretary of Defense (OSD)
- Director, Sensors and Electronics, Office of the Director, Defense Research and Engineering, OSD
- Technical Director, Office of Naval Research

"People come together here [JAWS S³], with different facilities of engagement, exploration, and alignment. This conference/symposium is really designed to directly serve the multidiscipline needs of our Joint Services. And one of the reasons why it's been very effective for us is because it's helped us focus on satisfying the needs of our operational decision makers."

—Air Force Lt. Col. Stanley J. Jarzombek Jr.

- Director, Embedded Computer Resources Support Improvement Program (ESIP) Program Office, Ogden Air Logistics Center, Hill AFB, Utah.

JAWS is About Communication

Air Force Lt. Col. Stanley J. Jarzombek Jr., program director for the Embedded Computer Resources Support Improvement Program (ESIP), who has been actively involved in JAWS for over five years, explains that JAWS is facilitating communication among different communities of practice.

"People come together here, with different facilities of engagement, exploration, and alignment. This conference-symposium is really designed to directly serve the multidiscipline needs of our Joint Services. And one of the reasons why it's been very effective for us is because it's helped us focus on satisfying the needs of our operational decision makers. We've brought operations between the acquisition R&D [Research and Development] community and the test and evaluation community closer together. And it's really caused an interaction and synergy among those communities of practice."

Jarzombek explained that in the early years, JAWS was focused on the test and evaluation and support community of practice; it then evolved with the changing mission environment to include those involved with obscurants, sensors, aerospace systems, and acquisition development, and how all of these different communities of practice, together with the M&S community, interact.

A 1999 JAWS organizer and avid supporter, Jarzombek finds great value in that coming together, and encourages participants to "... make sure that other people within your organizations understand what JAWS has to offer in the way of technical and professional development."

Scratching the Warfighters Where They Really Itch

James F. O'Bryon, Deputy Director of Operational Test and Evaluation/Live Fire Testing, Office of the Secretary of Defense, and co-sponsor of the 1999 JAWS S³

forum, opened the conference with a brief welcome to the participants, followed by a question directed at the very reason for their participation in JAWS.

"What is *information?*" he asked them. A lot of people, he noted, would answer that question in a lot of different ways. O'Bryon, however, defined information as, "inputs that provide a logical and useful basis to draw meaningful and timely conclusions on a given topic." And information, he told them, needs four things: a sender, a receiver, meaningful content, and a way to get it to the receiver. "All of them are necessary," he said, "to get what we call ' information' to the warfighter, from the warfighter to the command post or to others who might be supporting the mission."

O'Bryon said that during the symposium, the participants would be hearing about information in two contexts. "First of all, we're going to be talking about information necessary for the warfighter to support real-time combat decisions and operations. The other context in which they would be hearing about information, he said, was equally important.

"Not only does the combat operator out there need real-time information, there is also the need to have a method of transferring his or her needs from the battlefield, back through the acquisition system, to *make sure that we're scratching the warfighters where they really itch.*"

Give Them What *They* Need, Not What *You* Think They Need

O'Bryon emphasized the importance of really understanding the warfighter's requirements. "Be careful," he said, "to answer the question that's being asked, not some other question." Also understand the environment in which folks are going to be functioning. "We've got to realize that the combat situation is much more dirty, much more involved, and much more complicated." Get in early, he advised. "We need to affect design as early as possible and not come back and try to redesign [a system] over and over again. Why? Because it's *very, very, very* expensive."

Modeling and Simulation [M&S] alone, he added, is not the answer. "That doesn't mean M&S is useless, but that we've got a long way to go." He quoted Dr. Jacques S. Gansler, Under Secretary of Defense (Acquisition and Technology), who said, "Weapons systems conceived and formed in computers are already a reality, but the idea of extending modeling and simulations under weapons systems testing and life cycle operations and support for feedback [in the] design stage is a much more audacious step."

"At this symposium, we're going to get down to business and address those things," O'Bryon said. "It's our duty as designers and engineers, or whatever our function may be, to communicate for the people who are asking for the system, to the people that are designing it, what that warfighter's requirements really are."

Citing the case of the Joint Strike Fighter as an example, he said that right now, DoD is negotiating what the G-envelope needs to be for the Joint Strike Fighter. "Just asking for one more G could be very costly," he told the conferees. "What do you get back for it? We've got to make sure that those who are asking for changes or modifications understand the implications." Perhaps it might mean one less plane, or half as many planes, he said. "The total impact of these trades is not very obvious, and we need to make sure we communicate the implications quite clearly – not arrogantly, but in a manner that ensures they're known and understood."

Two Critical Customers

O'Bryon told the conferees that there are only two customers the DoD T&E community really must satisfy. One is the Secretary of Defense and the other is the warfighter, "... the person out there who is risking his or her life to meet the challenges and fulfill the mission that they've been sent to do. Everyone in between," he emphasized, "including me and all of us here, are part of the solution. We don't have to be happy, but we need to make sure that we are contributing to making those two people happy – the Secretary of Defense and the warfighter."
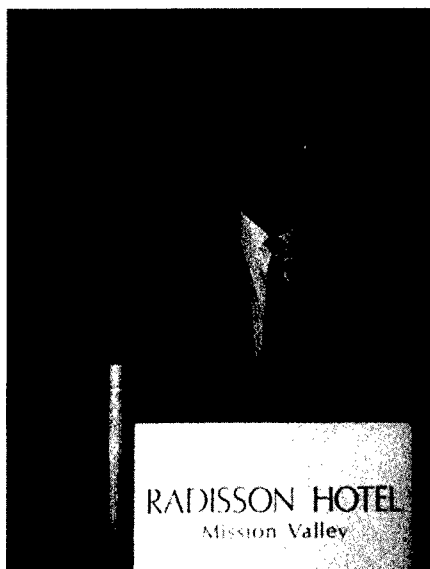
"DoD needs to aim where we think the threat is going to be ... Wayne Gretsky was often asked why he was so successful in his hockey playing. Gretsky's answer: 'I don't aim where the goal is and I don't aim where the player is to whom I'm passing the puck. I shoot the puck where the skater is going to be when the puck gets there.'"

—James F. O'Bryon

In other words, O'Bryon said, "*We need to pool our resources and not lose energy to unnecessary heat.*"

Aim for the Threat

DoD needs to aim where we think the threat is going to be, according to O'Bryon. To illustrate, he referred to famed hockey player Wayne Gretsky, who was often asked why he was so successful in his hockey playing. Gretsky's answer, O'Bryon said, was simple but profound. "I don't aim where the goal is and I don't aim where the player is to whom I'm passing the puck. I shoot the puck where the skater is going to be when the puck gets there."

He noted that the legislation that governs his office [Live Fire Testing], directs that his office test against *expected* threats – not just current threats, but the *expected threat in the outyears*. "Very, very difficult," he observed.

Change is Constant

It was Heraclitus who said about 2,300 or 2,400 years ago, "The only constant in the universe is change." Former Marine Corps Commandant Gen. Charles C. Krulak also alluded to change when he said, "We have a whole New World coming. If we go to war, it's not going to be linear or symmetric. It's going to be chaos." Strom Thurmond, the oldest member of the Congress, recently said, "There is no question that we have a sacred obligation to do everything possi-

ble before our people and weapons are committed to the harsh reality of the battlefield."

Yes, there's resistance to change, O'Bryon acknowledged. "But while you're at this symposium and when you leave, can I challenge you to 'think outside the box'? Let's not make our solutions more complicated than they really need to be," he added. "Do we really need to develop a ballpoint pen that writes in zero gravity, or can we simply use a pencil?" In other words, "There are lots of ways to answer a question, some of them deceptively simple," he concluded.

Making Information Work For the Warfighter

Retired Air Force Gen. Larry D. Welch, President, Institute for Defense Analyses and former Air Force Chief of Staff, served as the 1999 JAWS S³ keynote speaker. Referring to the symposium theme, he said that he could think of few subjects or challenges more important than, "Making Information Work for the Warfighter." To put the subject into context, Welch talked about three issues:

FOCUS ON WHAT THE WARFIGHTER CARES ABOUT

The first issue was simply the need to focus very clearly on what the warfighter cares about. And what the *warfighter* cares about, he noted, may be quite different from what the *information systems community* cares about.

COMPLEXITY OF BATTLESPACE SITUATION/OPERATIONS

Welch said "complexity" is the word that best describes today's warfighting environment. DoD expects the warfighter to deliver capabilities quickly and effectively that will allow our nation to dominate any adversary across the spectrum of conflict at every level of conflict.

"That means," said Welch, "that battlespace decision makers at all levels are directing multifunctional forces; that is, forces who do several things simultaneously, forces that have to be quickly tailorable, quickly deployable, rapidly adaptable, and operating in situations for which there is no rehearsal and in many cases for which there is very little specific preparation." DoD's task then, according to Welch, is to determine how to provide information to that range of situations that allow decision makers to make battlespace decisions.

INFORMATION OVERLOAD

The third issue was information overload. Welch challenged the audience to consider two questions. "When was the last time that you were asked to make a decision where you had too much information? When was the last time you were asked to make a decision when you had too little information?" The ratio, he said, is at least "a hundred to one in favor of the latter. DoD needs to limit the information pushed directly at the warfighter and make a very rich set of rele-

vant information available for the warfighter to pull, when needed, that allows those warfighters at all levels across the spectrum to make decisions that are always better and faster than the adversary can make."

Welch has a simple solution to overload. "Don't do it. Simply, don't do it." He added that he understands the necessity to package information so that it's more useful, and to screen out as much irrelevant and extraneous information as possible. "That doesn't mean I want to simplify the information available to that decision maker," he explained, "I want to enrich it. I want to give warfighters more relevant information."

High-Level Architecture

Welch also talked about the importance of a high-level architecture for battlespace decisions and four elements that have to be in an architecture:

ENABLERS
First are the enablers—communications, storage, extraction, accessing, labeling, perception aids, protection, and collaboration. Those are all important, said Welch. "Some of them are hard ... They're not the real drivers ... We know how to do most of those."

SYSTEM CONTROL
Second is system control, performance, access control, bandwidth allocation, and network management. These are also important, said Welch. "We have to be able to do that. We know how to do that. But they're not the drivers."

COLLECTION AND INPUT
The third is a matter of collecting information from all those sources and pushing that information into accessible networks. This area is complex, Welch said, but noted that packaging and screening out extraneous information are good. All these things are important, he said, but they're not the driver.

LEVERAGING INFORMATION TO MAKE INFORMED DECISIONS
The fourth is the purview of the battlespace leader and the battlespace deci-

"We can all agree that the outcome of most conflicts is decided by human performance, not machine performance, that the most compelling contribution to the art of war has little to do with the so-called rules of war or principles of war. The outcome of combat is decided by the courage of the soldiers, the quality of their leadership ... and their ability to make combat decisions that are relevant. And the ability to make relevant battlespace decisions is based on our ability to provide the right kind of information."

—Retired Air Force Gen. Larry D. Welch

sion maker. Welch described this as the ability to pull out of that system the information that a battlespace decision maker finds to be useful for their situation, for their management style, for their combat leadership style, and for that moment in time. "I suggest to you," said Welch, "that it is the fourth element that has to drive all the rest."

Asymmetrical Advantages

Welch talked about two asymmetrical advantages this nation now has over its adversaries — one *enduring*, the other *non-enduring*.

NON-ENDURING —
INFORMATION SUPERIORITY
The one that will not endure, he said, is information superiority. We enjoyed almost absolute information superiority during the Gulf War, he noted. The information revolution is spreading at such a pace, however, that he believes within a decade wide bandwidth and high-resolution centers will be available to anyone who has the money to buy the services. To counter that, Welch said that those who use commercial services will probably be better off than those who don't. The pace of change is so fast that he believes there's almost no possibility that the defense acquisition system will keep up with the commercial development pace. "Information superiority is transitory," he said, "and will not last."

ENDURING — DECISION SUPERIORITY
Decision superiority can be enduring, according to Welch. We have a cultural advantage in decision superiority that will be very difficult for anybody else to manage simply because we're, according to Welch, "a nation of information junkies." He noted that the average American child absorbs more information in a day than the adult in almost any other society on the face of the earth. "That's simply a cultural advantage that we have. It's no accident that the Internet was invented and prospered here. It's no accident in history that virtually every fundamental communications advance has been invented here. It's no accident that computer development pioneers saw the modern computer as an enormously important

computational machine ... as an information provider, a communications device, and decision enabling device. That all happens," Welch concluded, "because of the culture in which we live. So that's an asymmetric advantage that we can exploit."

But to exploit that advantage, Welch believes we still need to change the *information culture* from a push system (I will decide what you need, I will work with you closely, figure out what you need, and provide it), to what he calls the *Internet culture* (I have to make available to the battlespace decision maker [at all levels] a rich set of information from which they build their own information ensemble, from which they structure their own flow that comes to them and fits their style and their situation, that's infinitely tailorable and infinitely modified). "That," he concluded, "we *do* know how to do."

A Tricky Transformation
Getting through the transformation to these revolutionary advantages can be tricky, Welch acknowledged. It means lots of questions, lots of risks, and lots of experimentation. "It means we simply have to have a series of experiments until we find out what works and what does not work and what we have to change to make the important stuff work."

Welch concluded his remarks with a challenge. "We can all agree that the outcome of most conflicts are decided by human performance, not machine performance, that the most compelling contribution to the art of war has nothing to do with the so-called rules of war or principles of war. The outcome of combat is decided by the courage of the soldiers, the quality of their leadership, and their ability to deal with chance, that is, their ability to take advantage of favorable chance or good luck and their ability to minimize the adverse effects of unfavorable chance or bad luck. All of that is based on their ability to make combat decisions that are relevant. And the ability to make relevant battlespace decisions is based on our ability to provide the *right* kind of information."

Herein lies the challenge, according to Welch: to figure out how to move to that kind of capability, how to do it with acceptable risk, and how to know what pace of change that the force can stand. "It's a very big set of challenges," he observed, "with very big payoffs." He stated that we have no choice but to meet that challenge. "Because if we don't, then we will give up the most important asymmetric advantages that we have — an information culture and the quality of people that we have using this information — those are the two reinforcing asymmetric advantages that we simply have to leverage into the 21st century."

Consensus Building
Throughout the one-week conference, seven areas of concern to all the acquisition and technology communities of practice emerged as recurrent issues:

DEFENSE BUDGET
The nation and DoD can ill afford to ignore the realities of what this country needs. When we do, as one panelist commented, "Historically, we wind up fighting a war without the right tools, and we pay for it in the precious blood of our youngest generation." If we don't change this trend in the next few years, we are going to be right back in that same awful mess of having ignored our security.

RETAINING THE TECHNICAL WORKFORCE
The military has "kept the schoolhouse open" so to speak, but in the civilian community, the story is quite different. Looking at DoD's civilian ranks, the Department has virtually not hired for the last 10 years, to the point that there is now an almost missing generation. If this trend continues, 15 years from now when people who are seasoned and experienced should be in positions of running DoD's weapons programs and systems, the generation that should have been there to occupy those positions will essentially be missing. Industry too has a serious problem retaining people on government work. Typically, government work is regarded as a hassle, too much paperwork, with too little profit. Unless industry and DoD want to see themselves bereft of good workers, they must remedy this situation.

INDUSTRY INVOLVEMENT (PARTNERING)
Because the previous relationship of customer-supplier is rapidly evolving toward partnering, that requires industry to become an active participant in engineering trade-off decision processes throughout the research and development contracts and downselect phases. Industry must be heavily involved up-front, not just in the delivery.

RETURN ON INVESTMENT
If the nation expects industry to put its very best brain power on problem-solving processes so that the national security establishment is well served, DoD must figure out a way in which the purchasing reform process can give industry an adequate return on its investment. Otherwise, industry has no incentive to put its best talent on the problem. Government, in turn, will wind up with more and more Commercial Off-the-Shelf (COTS) technology and products designed for other users being adapted to government's purposes.

EMBRACING RAPID CHANGE
When the nation is standing still technologically, everybody else is catching up. And a nation standing still makes a tempting target for those who might want to co-opt or penetrate the country's critical defense systems and infrastructure. Adversaries can and will use the nation's dependence on critical systems as a vulnerability or a type of asymmetrical response to our systems and weapons superiority.

We need to embed in government and industry the idea that the nation is consciously turning over its critical weapons systems at a very high rate. The answer to rapid change, as one panelist commented, is "Don't fight it. Join it. It's your friend, not your enemy. Make change your asset. Embrace change."

It's much more difficult to attack a moving target than a stationary one. If adversaries see our systems — our infor-

mation systems and communications systems – as a moving target, one that we are consciously moving, it then becomes significantly more difficult for an adversary to attack or use our vulnerabilities against us.

MAINTAINING THE
TECHNOLOGICAL EDGE
Technology cannot be kept in a box. Nuclear threats or other unconventional threats, such as chemical or biological warfare, are the kinds of threats that the nation is going to have to respond to in the next 15 years. Unless we wake up to that, we're going to, as one of the conference sponsors commented, "... *still be chasing the problem instead of leading it. We still have the technological edge, but we don't have our eye on the ball.*"

EXPLOITING TEST AND EVALUATION, MODELING AND SIMULATION
The state of DoD's Test and Evaluation and Modeling and Simulation should continue to be considered from every aspect. But the United States must never believe that success in these two areas equals the real test.

The most difficult thing to simulate is the cleverness of an adversary. To outguess an adversary who's well informed and willing to take risks – that's the most difficult thing of all. That's a performance responsibility that, ultimately, is solely in the hands of the government.

What's Going On In the Battlespace?

General Larry Welch summarized what it will take, he believes, for DoD to truly

make information work for the warfighter: "We want every commander and operational leader to know what their commander wants and expects them to do; we want them to have an accurate up-to-date picture of their commander's intent.

"... The business of everyone understanding the commander's intent ... such that the commander's intent is based on a valid understanding of what's going on in the battlespace, and of having every commander at every level knowing what's going on around them – what's in front of them and what's behind them – that's the kind of *information superiority*, that's the kind of *decision superiority* that we're talking about to enable and take advantage of what should be an inherent advantage."

FY 2001 Best Qualified LTC/GS14
Acquisition Command and Product Manager Selection Board

Announcement Opens: 1 September 1999 - 1 November 1999
Board Date: 16-23 November 1999
(Announcement Number PM-FY2001-01)

This announcement is directed to Civilian Army Acquisition Corps (AAC) Members, and (Army) Corps Eligible (CE) individuals. Eligible civilians interested in being selected for PM positions must respond under this announcement.

The General Officer Steering Committee (GOSC) will meet prior to the board to make recommendations to the Army Acquisition Executive (AAE) on the list of positions to be considered under this announcement. A list of GOSC approved positions will be posted to this site when available.

This announcement will be used to solicit applications for those Product and Project Manager positions that are approved by the GOSC, and for unanticipated vacancies that occur in FY01.

Editor's Note: For general information, eligibility requirements, instructions on how to apply, or special requirements, go to **http://dacm.sarda.army.mil/news/PM-Boards/Main_Frameset.htm** on the Internet.

This announcement Expires Jan. 1, 2000

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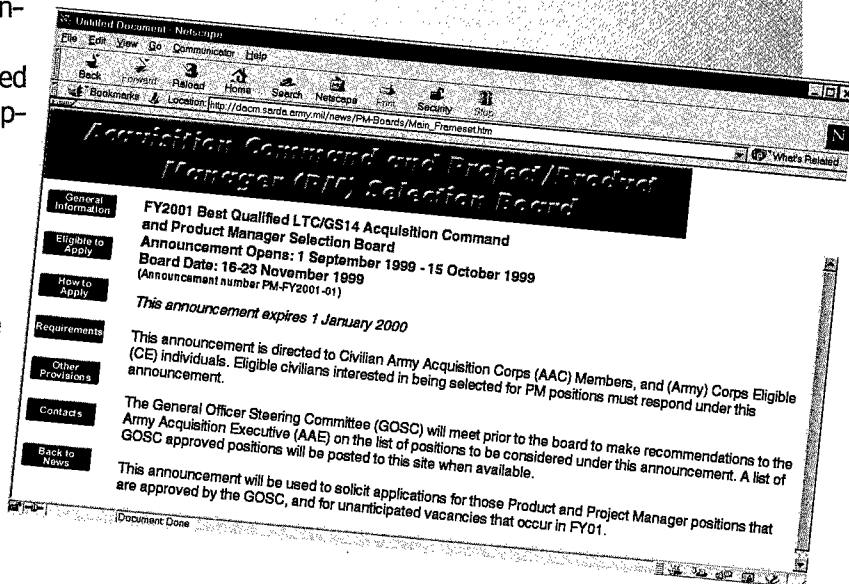
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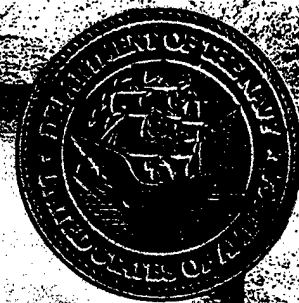
Architecting for Information Superiority

RON TURNER

In the past 24 months, the Department of the Navy Chief Information Office (DON CIO) sponsored two integrated product teams that have produced Information Technology (IT) architecture and standards guidance products that are fundamental building blocks for building an enterprise information infrastructure. These two products are for use by all DoN organizations and will enable the DoN to leverage information technology to better perform its missions.

In the mid-1990s, the General Accounting Office (GAO) published a widely acclaimed study, known as the "11 Best Practices for Information Technology." An alarming percentage of organizations implementing IT were failing, particularly in government. GAO found that in industry and government organizations that had successfully implemented IT programs, there were 11 best practices consistently and commonly employed. One of the most important of these was a defined and accepted set of IT architecture and standards. The tenets of the "Best Practices" were a foundation for the Clinger-Cohen Act of 1996, which in turn, was the genesis of the Office of Management and Budget Memorandum 97-16, Information Technology Architectures (ITA). The ITA requires the DON CIO to develop, maintain, and facilitate the implementation of the DoN's information technology architecture.

Responding to this, the DON CIO sponsored two separate, highly successful Integrated Product Teams (IPT). In the past 24 months, these IPTs have collaboratively developed two acknowledged outstanding ITA-related products. Both IPTs had representatives from each of the major Navy and Marine Corps organizations, their drafts reviewed by all Department organizations, and the final products unanimously approved by the DON CIO Board of Representatives.

The first product is the architecture document, known as the "DoN Information Technology Infrastructure Architecture (ITIA), Volume I." It was written by a 40-member Navy and Marine Corps team, led by Don Endicott of SPAWAR [Space and Naval Warfare Systems Command] and Ron Broersma, of SPAWAR [Systems] Center, San Diego. The ITIA describes the manner in which information will be exchanged over networks at the wide area, the metropolitan area, and the campus area. The complex document defines the ITI components, identifies demarcations, selects protocols, describes network services, suggests best practices, establishes performance metrics, and states how security mechanisms will be employed.

The second product is a standards document, known as the "DoN Information Technology Standards Guidance (ITSG)." It was written by an IPT led by Randy Cieslak, of SPAWAR and CINCPACFLT [Commander-In-Chief, U.S. Pacific Fleet]. The ITSG identifies and describes IT specification standards, products, and best practices for the DoN based on established criteria of security, functionality, interoperability, performance, and cost. A feature throughout the ITSG is the depiction of the recommended, emerging, and not recommended standards or technologies, to be used in conjunction with the ITIA by all Navy and Marine Corps IT managers for consistent IT planning, development, and implementation.

The ITIA successfully developed a solution path by acknowledging the multitude of legacy physical networks in the DoN that must be accommodated, and the diversity of the customer communications requirements — operational, organizational, and functional — which must be supported. The resulting solution is a network of networks, that must be melded to attain the required functionality, interoperability, and security across the DoN in the near term, and a

long-term strategy by which the DoN will build a more integrated and efficient enterprise infrastructure over time. The "glue" that melds these networks together is the detailed description of network services, such as domain naming, directory, and security services, that provide the basis for network components to interconnect and operate.

The ITIA uses the basic construct of the Open System Interconnect model to address the transport and applications-related layers that provide the network connectivity and services. Throughout this array of network layers and entities, there is a well-developed and integrated description of network security mechanisms that form a "Defense in Depth." The ITIA appendices provide specific guidance and decision making tools (including performance metrics) for planners of metropolitan area and campus area networks.

The ITSG amplifies the ITIA to describe how the components of the architecture must connect and interoperate at their boundaries. This is absolutely essential where there are multiple, decentralized implementations that must be complementary and interoperable. The most visible example of this is the ITSG's series of "continuum" charts that identify the emerging standards, the current standards, the projected standards, and the not recommended standards. This allows planners, implementers, and acquisition personnel to anticipate changes in standards and specifications, thereby, allowing multiple DoN organizations that are implementing networks in a decentralized fashion, to be successful.

The sequence of the ITIA and ITSG document development resulted in temporary overlaps in the type of information presented in each document. Now that the ITIA has been published, some of the process and service descriptions that are more architecture-oriented will be removed from the ITSG. To use a town planning analogy, the intent for the architecture (ITIA) is to describe the way the building design and services address required customer functionality, and for the building codes (ITSG) to detail the specific interfaces and products that should be used. This alignment of information will be performed during subsequent updates of the two documents.

The importance of collaboration and ownership of these two documents by the organizations within the Navy and Marine Corps is absolutely essential. It is likewise essential to have the participation, contribution, and buy in of the DoN IT managers and engineers. Both ITIA and ITSG contain time-sensitive data rendering them out-of-date in a matter of months. As customer requirements change, and as emerging IT products enable new communications capabilities and processes, updated architecture and standards must support these to support improved warfighting and business capabilities.

During the fall, the DoN IT Architecture and Standards IPT will reconvene to update these two documents. Both the ITIA and ITSG are available on the World Wide Web at **http://www.doncio.navy.mil.** If you have ideas for either the ITIA or ITSG documents, you should contact Richard Lynch, DON CIO Enterprise Architecture and Standards at **lynch. richard@hq.navy.mil.**

Editor's Note: Turner is the Deputy DON CIO for Technology. This information is in the public domain at **http://www.doncio.navy/comm/articles/chips/ information.html.**

Defense Leadership and Management Program

Program Promising Bright Future for Civilian Leadership Within DoD

As with any business, one of the greatest assets the Department of Defense has is its dynamic, expansive workforce. Threats to such a pool of talent, real or implied, call for an immediate and forceful strategy.

With an ever-changing mission and personnel leaving for the civilian sector, the Department created a new way to ensure its continued success. By carefully training and mentoring eligible personnel, DoD expects to groom only the most qualified people for the Department's most select positions.

Based on counsel of the Commission on Roles and Missions (CORM), DoD established the Defense Leadership and Management Program (DLAMP), designed to provide civilians with the background necessary to assume crucial roles within the Department. The CORM called for a change in the way its leadership develops, including long-term training and rotating assignments, as well as the opportunity for civilians to attend military service schools.

The program relies on its distinctive mentorship aspect between current leadership and program participants. Additionally, DLAMP is considered a "systematic program of 'joint' civilian leader training, education, and development within and across the DoD." Also unique to the program is an environment that fosters a sense of community between its civilian and military leaders. This expansive design ensures an understanding among DoD leaders, be they civilian or military.

> **As the Department continues to streamline its operations in an increasingly complex environment, civilian leaders must be as well prepared as their military counterparts to assume broader responsibilities.**

Moreover, DLAMP targets leadership positions within DoD that deal with the more important issues of policy, programs and personnel. Positions in the warfighting arena are also of interest to the DLAMP leadership.

Since its inception in early 1998, several hundred participants have enrolled in DLAMP training throughout and across DoD. Now in its third year, the program is growing in depth and breadth, and some of its first enrollees are nearing graduation.

In this interview, Dr. Diane Disney offers *Program Manager* readers insights as well as highlights of this dynamic program from her unique perspective as Deputy Under Secretary of Defense (Civilian Personnel Policy).

Q
What was the genesis of DLAMP?

A
As the 1990s began, it became very obvious that the world was changing more rapidly than ever before. With personnel numbers declining and DoD's mission becoming even more complex, the Department could no longer rely on its old approach to generate enough fully qualified people for top leadership positions. Therefore, in 1994, Civilian Personnel Policy made civilian leadership development one of its top three priorities.

Fortunately, as work with the Components proceeded, the Commission on Roles and Missions of the Armed Forces [CORM] called for major changes in the way civilian leaders were trained and educated. The CORM recommendations provided solid momentum for accelerating the change. By December 1996, the required Program Budget Decision was signed and in April 1997, the Deputy Secretary signed the enabling Directive. By the start of 1998, the Defense Leadership and Management Program [DLAMP] had recruited its first class and had begun offering classes.

Q

What makes the program unique?

A

DLAMP, a Department-wide programmatic effort aimed at jointly developing and educating our current and future senior civilian leadership, is unique in a number of ways. First, it is based on a cooperative effort across the various components of DoD. Second, it is premised on the concept of parity between military and civilian development. Finally, the curriculum covers a broad spectrum of DoD functional requirements, including the participants' strategic orientation, leadership development, and ability to integrate analytical thinking and problem solving. The basic elements of the Program are:

- A 12-month rotational assignment that provides an opportunity to broaden the student's experience and apply theoretical knowledge and leadership skills in a practical day-to-day work environment;
- Senior-level professional military education, focusing on national security decision making; and
- At least 10 advanced-level graduate courses to increase business acumen, with an emphasis on the DoD perspective.

Q

What does DoD stand to gain by having "military trained" civilians? Why not keep the division between civilians and military personnel?

A

The Department of Defense must have a well-trained and responsive total force of military and civilian leaders to meet the challenges of the next century. To this end, the DLAMP goal is to foster a shared understanding and sense of mission among civilian and military leaders.

As the Department continues to streamline its operations in an increasingly complex environment, civilian leaders must be as well prepared as their military counterparts to assume broader responsibilities. Moreover, the DLAMP experience serves to strengthen communication and trust among senior military and civilian leaders, thereby improving their ability to work cooperatively in support of the DoD's national security mission.

Q

What kind of unique opportunities does a civilian gain from entering such a long, intensive program? Why not just enroll in a graduate program?

A

DLAMP was designed to address the deficiencies in civilian preparation noted by the CORM. It is a comprehensive, career-enhancing program that parallels the successful military development model and emphasizes the DoD experience and DoD needs. Enrollment in a traditional graduate program can indeed be valuable, and for many fields is strongly recommended.

DLAMP, however, provides participants with education from a cross-section of the best schools in a range of fields, going beyond what might be offered at any single institution. Also, its elements are scheduled to minimize workplace dislocation and the stresses that come from taking traditional evening and weekend classes.

Q

What long-term benefits do you hope to realize from the program? What kind of executives do you hope to foster?

A

DLAMP aims to provide a well-educated cadre of senior civilian leaders who can understand and respond effectively to the complex issues facing DoD leaders. With training and education well outside the traditionally narrow occupational "stovepipes," these leaders will be able to grasp and analyze the issues facing the DoD quickly and thoroughly.

Because they can communicate effectively and work cooperatively with their military counterparts, they will be better equipped to resolve conflicts and support the attainment of mission requirements. Ultimately, their overall performance will be seen as a significant return on investment to the Department and the American taxpayer.

Q

Are there any tangible successes thus far?

A

DLAMP is a long-term development program that is only beginning its third year. However, even during this relatively short period, there have been successes. To date, these include:

- Twenty-six graduate-level courses in seven broad curriculum areas have been developed to date including accounting; information systems; economics; human resources; quantitative tools; and law and public policy. By the end of FY 1999, DLAMP will have conducted 60 graduate-level classes, with 822 participants in attendance. For FY 2000, 90 courses have been scheduled.
- DLAMP has greatly expanded the participation of civilians in the Senior Service Schools. To date, 99 participants have completed a 10-month Professional Military Education [PME] course, and 83 additional participants began a PME program in August 1999.
- A three-month PME course (Center for Defense Leadership and Management Program) was established at the National Defense University. Forty-eight participants have already graduated from this specially designed "fast-track" course.
- More than 200 rotational assignment opportunities have been made available to DLAMP participants throughout the Department.
- Sixteen program participants have already been promoted into the Senior Executive Service [SES].

Q

How many have enrolled thus far? Any graduates?

A

Currently 849 competitively selected participants are actively engaged in all aspects of the program. Several participants are close to completing the requirements for graduation and will probably complete all requirements when the

Capstone Course is offered this coming spring.

Q

How many civilians do you hope to enroll in the next three to five years?

A

Participants do not simply enroll. Component boards, using the SES criteria plus special DoD criteria, select participants competitively. Current plans call for 350 new enrollments per year.

Q

Explain the benefits of the mentorship aspects of the program? Who may serve as a DLAMP mentor?

A

Mentoring is an important ingredient in public and private-sector executive development. DLAMP's mentoring is designed to link each participant with a senior-level DoD official (civilian or military), who will provide guidance on career development. DLAMP mentors play an important role in assessing development needs, identifying career goals, planning for the achievement of DLAMP objectives, and evaluating the student's progress.

Mentors are current leaders who understand how to foster leadership in others. They are willing to share their experiences, insights, and personal contacts to help others set and meet career goals. To help in the process, the DLAMP Office maintains a clearinghouse of those officials who have volunteered to be DLAMP mentors. Many participants, however, find their own mentors through personal contacts or outreach efforts.

Editor's Note: Dr. Disney welcomes questions/comments concerning this article. Contact her at **disneyd@pr.osd.mil**. For further information on DLAMP, contact William Speedy at (703) 696-9634 or visit the DLAMP Web site at **http://dlamp.dfas.mil**.

DR. DIANE M. DISNEY

Deputy Assistant Secretary of Defense (Civilian Personnel Policy)

As Deputy Assistant Secretary of Defense for Civilian Personnel Policy, Dr. Diane M. Disney oversees the development and implementation of policies for managing the Department's workforce of nearly one million civil service and other employees. Her areas of responsibility include staffing, training and education, compensation, labor and employee relations, systems modernization and regionalization, and rightsizing. Her international activities include serving as a permanent member of the U.S.-Portugal Bilateral Commission; chairing a committee for the U.S.-Chilean Consultative Commission; providing technical assistance to the Defense Ministries of Slovenia, Croatia, Chile, and Argentina; and heading U.S. delegations negotiating with Germany on tax and employment issues.

Before coming to the Pentagon, Disney headed the Rhode Island Office of Defense Economic Adjustment, developed and managed the New England Defense Adjustment Project, and worked on numerous other defense-related projects in the region. For several years, she was director of the Research Center on Business and Economics at the University of Rhode Island (URI), where she was an associate professor of management. Active in economic development, she was a principal researcher for the state's Workforce 2000 Council through URI's Labor Research Center, as well as a member of the Governor's JOBS-RI Council.

For several years Disney had an adjunct appointment to the graduate faculty of the Heller School at Brandeis University, where she coordinated the Ford Foundation's project on employment-

related benefits. She has also headed the Rhode Island State Council on the Arts and worked as Rhode Island Associate for the Urban Institute's Nonprofit Sector Project.

In addition to serving as a management consultant to numerous governmental agencies and private concerns, Disney has been a board or committee member for over 30 nonprofit organizations, including the Naval War College Foundation and the National Federation of State Humanities Councils. In the public sector, she has served on the Federal Prevailing Rate Advisory Committee, the Federal Human Resources Technology Council, the Governor's Personnel System Review Committee, the Rhode Island Human Resource Investment Council, five state legislative commissions, and the Civil Justice Advisory Board for the U.S. District Court (as vice-chair). She was also a director of Providence Energy Corporation.

Disney received her Ph.D. from Brandeis University in Policy Analysis. She holds graduate degrees from URI as well as Duke University, and an undergraduate degree from Stetson University. She has written and edited publications on various aspects of management and governmental spending and has been book review editor of *Compensation & Benefits Management*. Her own most recent book is *The Sourcebook on Postretirement Health Care Benefits*. In 1994, she was named the Rhode Island Woman of the Year. In 1997, she was elected a Fellow of the National Academy of Public Administration. She also received the Distinguished Alumni Award for 1999 from Stetson University.

Resource Allocation Volume I: The Formal Process

Resource Allocation Volume II: Decision Making

Volume I describes the official resource allocation mechanisms used to develop the Department of Defense's portion of the President's Budget and the enactment of the congressional bills that adjust and fund the budget. Its principal topics are the military Joint Strategic Planning System; the Department of Defense's Planning, Programming, and Budgeting System; the Pentagon's acquisition process (including requirements generation); and the federal budget process. It is a single-volume reference that emphasizes the interaction within the structured resource allocation process.

Volume II is a guide for analysis-based defense resource allocation decision making. It promotes rational behavior within the formal process and introduces a decision-making framework based with five major phases: problem definition, analysis, decision, reconciliation, and execution. While many portions of the framework appear in other publications, this text emphasizes analysis as the foundation for optimal decision making and includes reconciliation of the decision as an inherent part of the process.

Both volumes in their current editions are available on the U.S. Naval War College Web site as Adobe.pdf files **<http://www. nwc.navy.mil/nsdm/nsdmrav1.htm>** and **<http:www.nwc. navy.mil/nsdm/nsdmrav2.htm>**. They are updated twice every year in the summer and winter.

Sun Tzu Exhibit Scores Direct Hit at Air Force Association Show

Sun Tzu, ancient Chinese warrior and military strategist, made a personal appearance at DSMC's booth at the Sept. 13-15 Air Force Association Show in Washington, D.C.

Author of the *Art of War* written in 450 B.C., Sun appeared in excellent shape for his age. He distributed DSMC catalogs and other publications from his favorite traveling chair inside a tower on the Great Wall. DSMC's booth theme was based on the concept that although Sun Tzu is still *the* source for the strategy of war, DSMC is the main source for the strategy of program management.

Sun's wisdom was expounded via a fortune cookie with a quote on one side and DSMC information on the other. A large poster with Chinese calligraphy and flyers with a list of Sun's wisdom, applicable to acquisition management, were also popular handouts.

Booth designer Greg Caruth once again succeeded in creating a "unique" environment that attracted the curious. Many attendees unofficially voted the booth best at this show. His previous DSMC booths have been just as unusual – including a "mechanical" Uncle Sam fortune-teller and the first caveman program officer.

For those unfamiliar with Sun Tzu, he recorded the causes and effects of battle strategy using experiences from a vast period of continuous civil war – known as the Warring States period – that preceded him by 50 years and lasted a total of 200 years. Sun's insights hold lasting appeal and application to the military and today's business managers. His strategies are so popular they appear virtually everywhere – books, study guides, Internet chatrooms – and are even available on some personal electronic notepads. Attendees have also mentioned a video game about Sun a few years ago. Even today, 2,450 years later, Sun Tzu lives!

Caruth, a big fan of ancient history, particularly Chinese history and art, collected his props from locations across the country, and was involved in the costume design as well. One of his other favorite subjects will become next year's theme – Leonardo da Vinci, a genius at military invention. But Leo was in sad need of reputable, skilled program managers to bring his tanks, flying machines, helicopters, and machine guns to reality during his century. Ed Boyd, better known as the caveman program manager or "Dave Cave" in past exhibits, will play Leo.
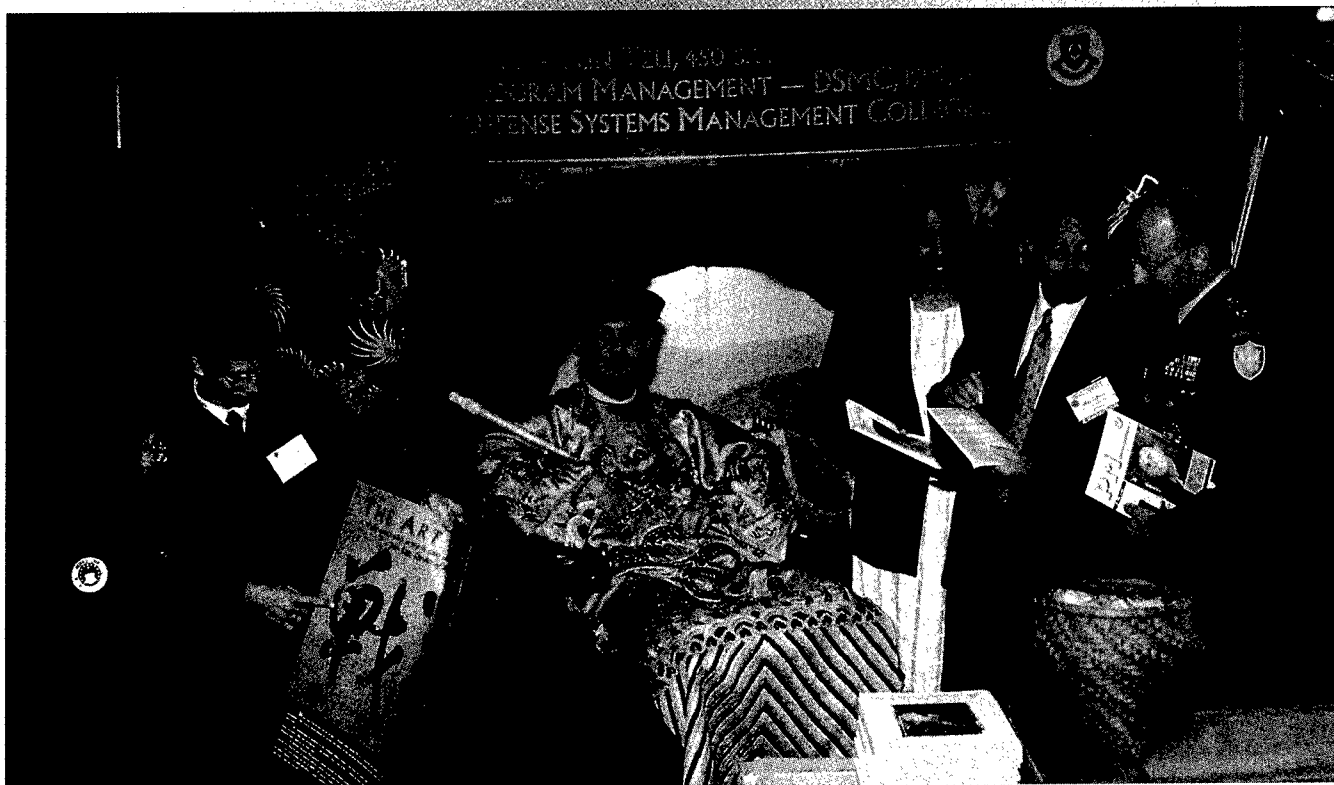
CATALOGS, POSTERS, EDUCATIONAL INFORMATION, AND MORE! VISITORS STOP BY DSMC's "ART OF WAR" EXHIBIT TO COLLECT DSMC PUBLICATIONS AND SAMPLE THE FORTUNE COOKIES. PICTURED FROM LEFT: CADETS DREW BURKLEY AND CRYSTAL KNAUER, AIR FORCE JUNIOR ROTC, MIDDLETOWN, DEL.; SUN TZU (PLAYED BY STEVE SHIH); AARONITA PERRY, AIR FORCE CIVILIAN, HEADQUARTERS, PENTAGON; GREG CARUTH, DSMC VISUAL ARTS AND PRESS DIRECTOR; ARMY LT. COL. DOUG WISNIOSKI, OFFICE OF THE CHAIRMAN, JOINT CHIEFS OF STAFF, PENTAGON..

Photo by Richard Mattox

Sun Tzu – Ageless Wisdom in the Art of Warfare for Today's Acquisition Warriors and PMs

A truly successful army is one that no one dares to fight.

Know your enemy well. Knowledge of the enemy is best obtained through spies.

All warfare is based on deception. What the enemy thinks is more important than the truth.

Take the enemy when it is least prepared.

Weary a rested enemy, starve him when he is well-fed, and make him move when he is tired.

Leave the enemy a path of escape. An enemy driven into a corner acts irrationally.

Avoid an enemy's strengths and strike its weaknesses.

Feasible plans take into account the best and worst that can happen.

Weapons are ominous tools to be used only when there is no alternative.

When you prepare to fight everywhere, you are weak everywhere.

Don't repeat tactics just because they worked before; change methods with new circumstances.

Advance without expecting fame; retreat without fear of disgrace. Always do what is best for the country.

A good leader has wisdom, sincerity, benevolence, courage, and strictness.

All warfare is based on deception. What the enemy thinks is more important than the truth.

Bait and entice the enemy. Choose times and situations to your advantage.

Prolonged warfare benefits no one.

Any fight can be won by determination. A clever fight is won by thought.

Know when to fight and when not to fight.

A leader needs freedom to act without interference from politicians.

The spirit of the troops must be as high at the bottom as it is on the top.

Defeat an enemy by defeating his strategy. Defeat his strategy by adopting it.

If you know the battleground, you control the battle.

Speed is the essence of war. Travel unexpected routes and strike where the enemy is unprepared.

Paraphrased from numerous books of quotations, with special credit to Thomas Cleary's book, *The Illustrated Art of War* by Sun Tzu, Shambhala Publications, 1998.

GSA Publishes The Integrated Workplace: A Comprehensive Approach to Developing Workspace

To help federal agencies develop workspace that better suits their business needs, the U.S. General Services Administration (GSA) has published *The Integrated Workplace, A Comprehensive Approach to Developing Workspace.* The report provides an overview and describes the basic elements of the Integrated Workplace; why it is important; how it can help improve employee productivity, health, and satisfaction; and how it can improve space usage. It also provides a broad framework for implementing Integrated Workplace solutions and serves as a platform for future program development.

The report is now available at **http://policyworks.gov/org/main/mp/library/policydocs/agiwp.htm** on the Internet.

Oliver Publishes Guidance on Contractor Performance Assessments

PRINCIPAL DEPUTY UNDER SECRETARY
3015 DEFENSE PENTAGON
WASHINGTON, DC 20301-3015

ACQUISITION AND
TECHNOLOGY

AUG 24 1999

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
      ATTN: SERVICE ACQUISITION EXECUTIVES
      GENERAL COUNSEL OF THE DEPARTMENT OF DEFENSE
      DIRECTOR, BALLISTIC MISSILE DEFENSE ORGANIZATION
      DIRECTOR, DEFENSE PROCUREMENT
      DIRECTOR, STRATEGIC AND TACTICAL SYSTEMS
      DIRECTOR, SYSTEMS ACQUISITION
      COMMANDER, DEFENSE CONTRACT MANAGEMENT COMMAND

SUBJECT: Contractor Performance Assessments

    In my April 19, 1999 memorandum, I established a new requirement for DOD program managers to conduct quarterly contractor performance assessments on development contracts in excess of $50 million. I'm revising this memorandum by:

        - changing the rating system to be consistent with current DOD policy on past performance rating elements (i.e. five elements instead of four) and;

        - standardizing the color rating scheme for use on all performance assessments (per the attachment, Dark Blue, Purple, Green, Yellow, and Red, high to low).

    I want to emphasize that while I see the intent of both quarterly and annual performance reviews being similar (i.e, providing performance feedback), each has a specific purpose. The quarterly feedback assessment is intended as a more frequent tool to improve contractor performance and to ensure a constant dialogue between the program manager and the contractor. The more formal annual assessment, meanwhile, while also aimed at improving performance, seeks contractor feedback and provides source selection teams with past performance information needed to make best value awards.

Dave Oliver

Attachment:
As stated

Call for Authors

We are actively seeking quality manuscripts on topics related to Defense acquisition. Topics include opinions, lessons-learned, tutorials, and empirical research.

References must be cited in your bibliography. Research must include a description of the model and the methodology used. The final version of your manuscript must conform to the *Publication Manual of the American Psychological Association* and the *Chicago Manual of Style.*

To obtain our *ARQ* Guidelines for Authors, or to inquire about your manuscript's potential for publication, call the DSMC Press at (703) 805-4290 or DSN 655-4290, fax (703) 805-2917 or e-mail gonzalezd@dsmc.dsm.mil

Call for Referees

We need subject-matter experts for peer reviews in our blind referee of manuscripts.

Please fax your credentials to us and we will add you to our reference file (703) 805-2917.

ATTN: DSMC PRESS
Editor, *ARQ*

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ACQUISITION
Review
Q U A R T E R L Y

VOL. 6   NO. 3

ACQUISITION REFORM

An Internet Listing Tailored to the Professional Acquisition Workforce

Surfing the Net

DEPARTMENT OF DEFENSE

Under Secretary of Defense (Acquisition and Technology) (USD[A&T])
http://www.acq.osd.mil/
ACQWeb offers a library of USD(A&T) documents, a means to view streaming videos, and jump points to many other valuable sites.

Deputy Under Secretary of Defense (Acquisition Reform) (DUSD[AR])
http://www.acq.osd.mil/ar
AR news and events; reference library; DUSD(AR) organizational breakout; acquisition education and training policy and guidance.

Acquisition Systems Management
http://www.acq.osd.mil/api/asm/
Documentation, including Department of Defense Directives 5000.1 and 5000.2-R, Major Defense Acquisition Programs List, and more.

Director, Test, Systems Engineering & Evaluation (DTSE&E), USD(A&T)
http://www.acq.osd.mil/te/programs/se
Systems engineering mission; Defense Acquisition Workforce Improvement Act information, training, and related sites; information on key areas of systems engineering responsibility.

Defense Acquisition Deskbook
http://www.deskbook.osd.mil
Automated acquisition reference tool covering mandatory and discretionary practices.

Defense Acquisition University (DAU) and Acquisition Reform Communications Center (ARCC)
http://www.acq.osd.mil/dau
DAU course and schedule information; consortium school links; documents, publications, and forms. ARCC provides acquisition reform training opportunities and materials.

Defense Acquisition University Virtual Campus
https://dau.fedworld.gov
Take DAU courses online at your desk, at home, at your convenience!

Army Acquisition Corps (AAC)
http://www.dacm.sarda.army.mil
News; policy; publications; personnel demo; contacts; training opportunities.

Army Acquisition
http://www.acqnet.sarda.army.mil
A-MART; documents library; training and business opportunities; past performance; paperless contracting; labor rates.

Navy Acquisition Reform
http://www.acq-ref.navy.mil/
Acquisition policy and guidance, World-Class Practices, the Acquisition Center of Excellence, and training opportunities.

Navy Acquisition, Research and Development Information Center
http://nardic.nrl.navy.mil
News and announcements; acronyms; publications and regulations; technical reports; "How to Do Business with the Navy," and much more!

Naval Sea Systems Command
http://www.navsea.navy.mil/sea017/toc.htm
Total Ownership Cost (TOC); documentation and policy; Reduction Plan; Implementation Timeline; TOC reporting templates; Frequently Asked Questions (FAQ).

Air Force (Acquisition)
http://www.safaq.hq.af.mil/
Policy; career development and training opportunities; reducing TOC; library; links.

Air Force Materiel Command (AFMC) Contracting Laboratory's Federal Acquisition Regulation (FAR) Site
http://farsite.hill.af.mil/
FAR search tool; *Commerce Business Daily* Announcements (CBDNet); *Federal Register;* Electronic Forms Library.

Headquarters, Air Combat Command (HQ ACC) — Contracting Division
http://www.acclog.af.mil/lgc/lgc.htm
Business opportunities; acquisition regulations; policy guidance and technical assistance in areas such as: performance measurement, International Merchant Purchase Authorization Card (IMPAC); commercial practices; competitive sourcing and more.

Defense Systems Management College (DSMC)
http://www.dsmc.dsm.mil
DSMC educational products and services; course schedules; *Program Manager* magazine and *Acquisition Review Quarterly* journal; job opportunities.

Defense Advanced Research Projects Agency (DARPA)
http://www.darpa.mil
News releases; current solicitations; "Doing Business with DARPA."

Defense Information Systems Agency (DISA)
http://www.disa.mil
Structure and mission of DISA; Defense Information System Network; Defense Message System; Global Command and Control System; much more!

National Imagery and Mapping Agency (NIMA) [Formerly Defense Mapping Agency (DMA)]
http://www.nima.mil
Imagery; maps and geodata; Freedom of Information Act resources; publications.

Defense Modeling and Simulation Office (DMSO)
http://www.dmso.mil
DoD Modeling and Simulation Master Plan; document library; events; services.

Defense Technical Information Center (DTIC)
http://www.dtic.mil/
Technical reports; products and services; registration with DTIC; special programs; acronyms; DTIC FAQs.

Joint Electronic Commerce Program Office (JECPO)
http://www.acq.osd.mil/ec/
Policy; newsletters; Central Contractor Registration; assistance centers; DoD Electronic Commerce Partners.

Open Systems Joint Task Force
http://www.acq.osd.mil/osjtf
Open Systems education and training opportunities; studies and assessments; projects, initiatives and plans; reference library.

Government Education and Training Network (GETN) (For Department of Defense Only)
http://atn.afit.af.mil/schedule_page.htm
Schedule of distance learning opportunities.

Government-Industry Data Exchange Program (GIDEP)
http://www.gidep.corona.navy.mil
Federally funded co-op of government and industry participants that provides an electronic forum to exchange technical information essential during research, design, development, production, and operational phases of the life cycle of systems, facilities, and equipment.

ACQUISITION REFORM

An Internet Listing Tailored to the Professional Acquisition Workforce

Surfing the Net

FEDERAL CIVILIAN AGENCIES

ARNET (Joint Effort of the National Partnership for Reinventing Government and Office of Federal Procurement Policy)
http://www.arnet.gov/
Virtual library; federal acquisition and procurement opportunities; best practices; electronic forums; business opportunities; acquisition training; Excluded Parties List.

Federal Acquisition Institute (FAI)
http://www.faionline.com
Virtual campus for learning opportunities as well as information access and performance support.

Federal Acquisition Jump Station
http://nais.nasa.gov/fedproc/home.html
Procurement and acquisition servers by contracting activity; CBDNet; Reference Library.

Federal Aviation Administration (FAA)
http://www.asu.faa.gov
Online policy and guidance for all aspects of the acquisition process.

General Accounting Office (GAO)
http://www.gao.gov
Access to GAO reports, policy and guidance, and FAQs.

General Services Administration (GSA)
http://www.gsa.gov
Online shopping for commercial items to support government interests.

Library of Congress
http://www.loc.gov
Research services; Congress at Work; Copyright Office; FAQs.

National Partnership for Reinventing Government (NPR)
http://www.npr.gov/
NPR accomplishments and inititatives; "how to" tools; library.

National Technical Information Service (NTIS)
http://chaos.fedworld.gov/onow/
Online service for purchasing technical reports, computer products, videotapes, audiocassettes, and more!

Small Business Administration (SBA)
http://www.SBAonline.SBA.gov
Communications network for small businesses.

U.S. Coast Guard
http://www.uscg.mil
News and current events; services; points of contact; FAQs.

TOPICAL LISTINGS

DoD Acquisition Workforce Personnel Demonstration Project
http://www.crfpst.wpafb.af.mil/
Federal Register and Waivers Package; documents and briefings; reference material; operating procedures; FAQs.

DoD Specifications and Standards Home Page
http://www.dsp.dla.mil
All about DoD standardization; key Points of Contact; FAQs; Military Specifications and Standards Reform; newsletters; training; nongovernment standards; links to related sites.

Joint Advanced Distributed Simulation (JADS) Joint Test Force
http://www.jads.abq.com
JADS is a one-stop shop for complete information on distributed simulation and its applicability to test and evaluation and acquisition.

Risk Management
http://www.acq.osd.mil/te/programs/se/risk_management/index.htm
Risk policies and procedures; risk tools and products; events and ongoing efforts; related papers, speeches, publications, and Web sites.

Earned Value Management
http://www.acq.osd.mil/pm
Implementation of Earned Value Management; latest policy changes; standards; international developments; active noteboard.

Fedworld Information
https://dau.fedworld.gov
Comprehensive central access point for searching, locating, ordering, and acquiring government and business information.

GSA Federal Service Supply
http://pub.fss.gsa.gov
The No. 1 resource for the latest services and products industry has to offer.

INDUSTRY AND PROFESSIONAL ORGANIZATIONS

Commerce Business Daily
http://www.govcon.com/
Access to current and back issues with search capabilities; business opportunities; interactive yellow pages.

Electronic Industries Alliance (EIA)
http://www.eia.org
Government Relations DepartmenT; includes links to issue councils; market research assistance.

National Contract Management Association (NCMA)
http://www.ncmahq.org
"What's New in Contracting?"; educational products catalog; career center.

National Defense Industrial Association (NDIA)
http://www.ndia.org
Association news; events; government policy; *National Defense* Magazine.

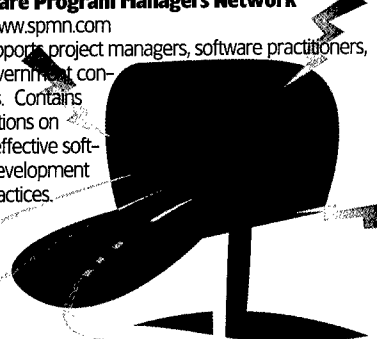### International Society of Logistics
http://www.sole.org/
Online desk references that link to logistics problem-solving advice; Certified Professional Logistician certification.

Computer Assisted Technology Transfer (CATT) Program
http://catt.bus.okstate.edu
Collaborative effort between government, industry, and academia. Learn about CATT and how to participate.

Software Program Managers Network
http://www.spmn.com
Site supports project managers, software practitioners, and government contractors. Contains publications on highly effective software development best practices.

If you would like to add your acquisition or acquisition reform-related Web site to this list, please call the Acquisition Reform Communications Center (ARCC) at 1-888-747- ARCC. DAU encourages the reciprocal linking of its Home Page to other interested agencies. Contact the DAU Webmaster at: **dau_webmaster@acq.osd.mil**

# DSMC'S POPULAR DEFENSE SYSTEMS ACQUISITION MANAGEMENT CHART NOW UPDATED!

Based on the latest changes to DoDD 5000.1 and DoDR 5000.2-R, the Defense Systems Management College (DSMC) recently updated their Defense Systems Acquisition Management Process Chart, marking the eighth evolution of this uniquely successful chart. To date, DSMC has distributed the chart to over 70,000 students and members of the acquisition community.

First published in the January–February 1984 issue of *Program Manager* Magazine, DSMC uses the chart as a training/integration aid in many DSMC courses. Other educational institutions that also use the chart for much the same purpose include: Air Force Institute of Technology; Southeastern Institute of Technology; Army Logistics Management College; University of Houston; Army Engineer School; Air Force Operational Test and Evaluation Center; University of Maryland; Computer Science School at Fort Gordon; University of Southern California; and the Industrial College of the Armed Forces (Senior Acquisition Course).

As structured, the chart serves as a convenient road map of acquisition functions throughout the system life cycle. Based on policies and current best practices, it summarizes (in time sequence) the key events, activities, players, and documents used throughout the system life cycle.

A DSMC Process Action Team, representing each government acquisition discipline, completed this substantial effort on behalf of the entire government-industry acquisition workforce.

Editor's Note: A smaller version of the chart can be downloaded and printed from the DSMC Home page in Acrobat as a PDF file. To download, go to **http://www.dsmc.dsm.mil/pubs/chart3000/ch_3000.htm** on the DSMC Web site.
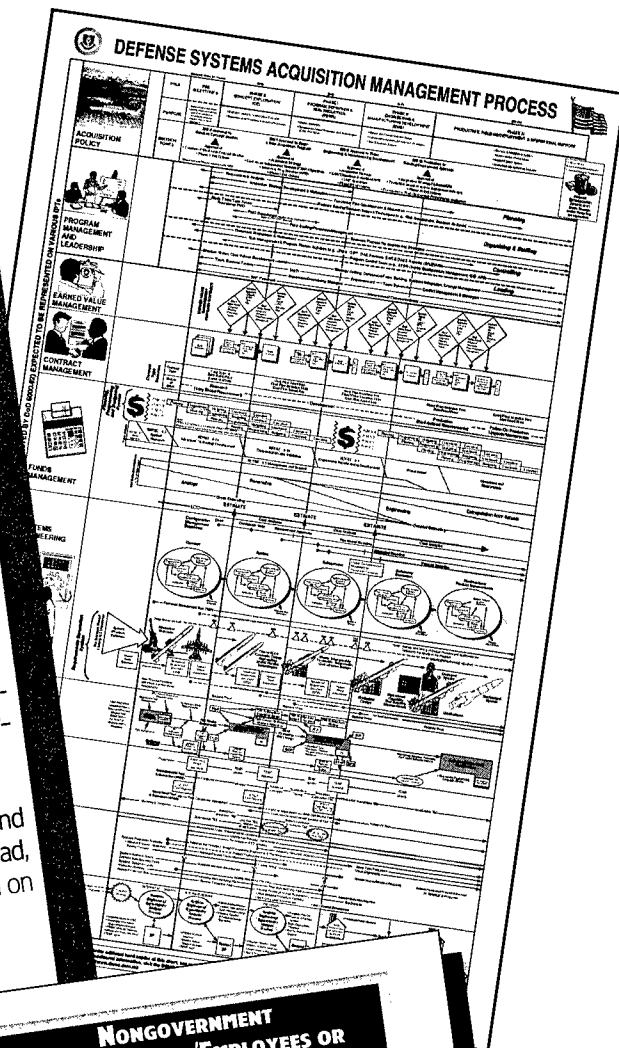
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